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Quality of Castings Depends on Blast Furnace Practice

Control of Coke Quality and Amount of Water in Blast Will Help Foundrymen To Obtain More Uniform Pig Iron

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PROBABLY no raw material used in foundries has received more blame for defective castings than pig iron. It is difficult to determine what percentage of defects attributed to this material is warranted. Likewise, it is a question how many troubles there are for which pig iron is the cause without being suspected.

The foundry managers of General Motors Corp. divisions were deeply interested in this problem. They asked that an investigation be conducted to clear up some of the mystery about pig iron. Steps were taken to set up a small foundry operation so that pig irons from various blast furnaces could be melted as part of the cupola charge to make gray iron for automotive castings. Gray irons made from these pig irons were subjected to tests to determine the relation between the properties of the cast iron and the conditions of operation during the manufacture of the pig iron.

The investigation consisted of making a series of physical tests upon cast irons of the same analysis poured at the same temperature and made under similar conditions from pig irons of the same chemical specifications obtained at different times from different blast furnaces and whose

History of ore reduction in blast furnace influences quality of iron tapped from cupola

Investigation Yields Original Data

FOR many years foundrymen and blast furnace operators have discussed the influence of ironmaking practice on the quality of castings. It has been known that pig irons of like chemical analysis may vary in certain physical properties and that castings made from them reflect these variations. The accompanying article, carefully abstracted from one of the most important papers presented at the thirty-third annual meeting of the American Foundrymen's association this week at Chicago, is based on a comprehensive investigation of blast furnace operation, cupola practice and physical properties of resultant castings. This contribution of original data to the literature of this subject is well worth attention of all foundrymen and producers of pig iron.

—THE EDITORS.

blast furnace history was known as completely as possible. The variation in the properties of the cast irons was taken as an indication of the differences in quality of the pig iron used. The method of procedure was as follows:

1. Eleven casts of about 75 tons each of No. 2X malleable pig iron, containing silicon as near 2.50 per cent as possible, were obtained from seven different blast furnaces over a period of a year. During the manufacture of the pig iron a record was made of blast furnace operating conditions. A typical data sheet is shown in Fig. 1.

2. Tests made on the pig irons were chemical analysis, microstructure, fracture, dilation characteristics and spectrum analysis.

3. The pig irons were used for the production of cast iron flywheels. The analysis aimed at was carbon, 3.00 to 3.30; silicon, 2.25 to 2.35; manganese 0.55 to 0.95; sulphur 0.10 per cent maximum and phosphorus, 0.20 per cent maximum.

Melting Practice Followed

We tried to maintain the following standard melting conditions at all times:

(a) Charge—1000 pounds consisting of 500 pounds of pig iron, 137 pounds of steel (low carbon punch press scrap), 250 pounds of gates and sprues from the cupola heat of the previous day, 113 pounds of 7 per cent silicon silvery iron and 125 pounds of coke.

Test specimens were not cast until more than three days after changing to the use of a new cast of pig iron in order to get the effect of the back scrap containing the new pig iron.

(b) Coke—Burning rate to be less than 3.5 minutes for 250 degrees Fahr. temperature rise and minimum temperature rise of 270 degrees Fahr.

(c) Blast—1300 cubic feet per minute. Atmospheric temperature, pressure and humidity readings were made during every heat. The coke bed was 36 inches above the tuyeres.

4. The cast iron produced in this manner was tested for:

(a) Tensile strength of 1¼-inch bar as cast.
(b) Tensile strength of ⅝-inch bar as cast.
(c) Transverse strength of 1¼-inch round bar 12 inches long.
(d) Hardness of various sizes of section cast in green sand and in core sand.
(e) Machinability of ⅜, ¾ and 1¼-inch slabs.
(f) Fluidity.
(g) Volume shrinkage.
(h) Linear shrinkage.
(i) Density.
(j) Microstructure.

In investigating the pig iron, the

Sample Data Sheet

PIG IRON—BLAST FURNACE DATA

G.M. Purchase Order No.....G.M. Research Lot No.....
1. Furnace No. .....Location .....
2. Superintendent .....Date Produced .....
3. Heat No. .....Type Charging Top .....
4. Ore Charge.....lbs. Coke Charge.....lbs. Ratio.....
5. Composition of Burden.

	Kind of Ore.....	*Pounds*	*Per Cent* .....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....

6. Kind of Coke .....

		Analysis	
1. Shatter Test		Fixed Carbon	
2. True sp. gr.		Vol. Hydro C.	
3. App. sp. gr.		Ash	
Porosity		Sulphur	
		Water	

7. Dry-Wet Blast?
8. Blast Temp.....max. .....min. .....cycle.
9. Blast Pressure....lbs. sq. in. ....lbs. sq. in. max. ....lbs. sq. in. min.
10. Air per hour.....cu. ft. .....lbs.
11. Fuel burnt per hr. .....lbs. .....lbs. per sq. ft. area. at max. dia.
12. Pounds of air per lb. of fuel..... Air per lb. of carbon.....lbs.
13. Blast velocity through tuyeres.....ft. per min.
14. Composition of Top Cases....% CO ....% CO_2 ....% H ....% N
15. Temperature of Top Cases.....
16. Burden per hr.....lbs. .....lbs. per sq. ft. area at max. dia.
17. Composition of slag.

	Flushing Slag		*Casting Slag*		
SiO_2	.....	.....	.....	.....	
Al_2O_3	.....	.....	.....	.....	Appearance of Slag... .....
CaO	.....	.....	.....	.....	
MnO	.....	.....	.....	.....	
FeO	.....	.....	.....	.....	Slag per ton of iron produced.....lbs.
MgO	.....	.....	.....	.....	
CaS	.....	.....	.....	.....	

18. Weight iron produced per hour.....lbs.
Weight per sq. ft. area at max. dia. per hour.....lbs.
19. Depth of metal in hearth at tapping.....ft.
20. Casting Temp....., ..., ..., ..., ..., ...°F
Average.....°F.
21. Time between cast.....hours.
22. Dimensions of Furnace.
1. Stock line to tuyeres.....ft., ...in.
2. Tuyere level to hearth.....ft., ...in.
3. Size and number of tuyeres.....
4. Iron notch to cinder notch.....ft., ...in.
5. Dia. at top of bosh.....ft., ...in.; straight.....ft., ...in.
6. Dia. at hearth.....ft., ...in.
7. Cubical contents of furnace.....cu. ft.
23. Chemical Analysis:

Average of Five Pigs					
T.C.	C.C.	Mn.	P.	S.	Si
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

24. Atmosphere Temperature.....°F.
25. Barometric Pressure.....inches Hg.
26. Humidity.....%. .....gr. per cu. ft.

ideal course is to maintain all variables constant, but this is quite impossible, due to inability to regulate the amount of water in the atmosphere, temperature and pressure of the atmosphere, variation of several properties of pig iron due to variable blast furnace conditions and other factors. The best that can be done is to record these items and take them into consideration in our conclusions.

After collecting the data at the blast furnace during the production of each of the sample casts of pig iron, the information was used to calculate performance values. The results are shown in Table I. This summary sheet reveals the great variation in the methods existing at various furnaces in the production of the same kind of pig iron.

We know that coke varies tremendously. Coke in itself is responsible for some of the worst variations in blast furnace operation. In Table I the heats of iron are identified by numbers from 1 to 11 and the blast furnaces in which the iron was made by letters from A to G. Starting at the first item we see that the pounds of coke per ton of iron produced varied from 1765 to 2440 and it happens that this variation was in one furnace in one week's time.

To compare the operation of the different blast furnaces on a uniform basis, the quantities of air, coke, ore, etc. flowing through the furnace are reduced to quantities per one square foot of furnace cross-sectioned area at the maximum diameter which is at the top of the bosh. This basis makes the data directly comparable. The great difference in the furnace operation being studied is astonishing.

The third item gives the pounds of burden descending per hour in each vertical column of one square foot cross-sectional area. This speed of travel varies from 178.5 pounds during production of lot 2 to 363.5 pounds during production of lot 7. The latter rate was attained in a furnace only 68 feet from hearth to stock line, while the former was in a 72-foot furnace. When we take into consideration the height of the furnace in determining the relative time that any particle of ore remains in the furnace, we find that each particle of burden remained in A furnace while making heat, 2, 2.16 times as long as the burden remained in D furnace while making heat 7. If the proper amount of time to reduce iron ore was used in G furnace, then certainly insufficient time has been allowed for complete reduction of the ore while making heat 7 in D furnace. The time of the ore in the furnace in making the other nine heats, falls between these two cases cited.

The rate of travel of this burden of course depends on the rate of coke combustion. If a readily combustible coke is used, the rate of coke combustion is determined by the rate at which air is supplied. Increasing the speed of combustion by faster delivery of air is possible only up to the maximum burning rate of the coke. This maximum burning rate varies widely among different cokes, and even among cokes which are accepted as being alike on the basis of analysis and per cent cell space. The performance of the various furnaces indicates that due to the very combustible quality of the coke in some instances, blowing in large quantities of air speeds up combustion and burden travel, while in other cases increasing the air does not speed up combustion simply because the coke is not a fast burning coke and will not respond to the increase in blast volume. The difference in combustiblity of cokes is well illustrated by the following results of a test:

Description	Total Temp. rise degrees Fahr.	Time for 250° Fahr. Temp. rise in minutes
Petroleum coke	360	1.6
A good beehive coke	300	2.2
Coke for pig iron No. 7	325	2.65
Coke for pig iron No. 6	295	2.0
Coke for pig iron No. 2	260	3.5
Coke for pig iron No. 11	285	8.0

Table II shows how the rate of iron production varies with the quality of the coke. The combustibility results represent averages of six test runs on each coke.

It is quite apparent that a fast burning coke is a requisite for rapid production of pig iron. In the case of heat 6, furnace C and heat 7, furnace D, the air used per pound of coke carbon was about the same, viz., 4.27 and 4.48 pounds air per pound carbon in coke, but the coke burnt per hour in furnace C was 111 pounds as against 148.2 pounds in furnace D. This was due simply to the fact that air was supplied faster to furnace D. Because the coke was capable of rapid combustion the heat was produced and utilized at a faster rate.

In furnace D there were supplied 606 pounds of air per hour per square foot of area, while in furnace C only 443 pounds were supplied per hour per square foot of area. The reason for the use of about equal amounts of air per pound of carbon is found in the similarity of combustibility character of the two cokes. Although the igni-

Table I

Blast Furnace Operating Data

Heat No. and Furnace	1A	2A	3A	4A	5B	6C	7D	8E	9E	10F	11G
Lbs. coke per long ton iron produced	2160	2130	1930	2000	2120	1845	1860	2440	1765	2170	2000
Lbs. iron produced per hr, per sq. ft. area	121.3	99.8	122.0	115.0	113.5	135.3	179.0	195.8	117.0	123.0	96.2
Lbs. burden descending per hr. per sq. ft. area	228.0	178.5	221.2	234.5	229.8	270.0	363.5	212.0	214.5	243.0	179.2
Lbs. coke burnt per hr. per sq. ft. area	117.1	94.9	105.1	102.5	107.5	111.0	148.2	104.2	92.7	119.4	84.5
Lbs. air per lb. carbon in coke	4.53	5.25	4.55	4.98	5.37	4.27	4.48	5.68	6.30	5.52	6.03
Lbs. air per lb. of burden	2.11	2.54	1.96	2.00	2.30	1.64	1.67	2.46	2.41	2.46	2.41
Lbs. air per hr. per sq. ft. area at max. dia.	482	452	437	468	526	443	606	522	516	574	432
Lbs. air per lb. of iron produced	3.98	4.53	3.58	4.07	4.66	3 29	3.39	5.45	4.42	4.66	4.60
Grains water per cu. ft. of air	3.2	6.1	2.6	2.2	2.7	1.56	2.3	1.51	2.8	1.75	1.3
Lbs. water in blast per ton iron produced	55.0	121.6	38.5	35.5	53.2	22.0	32.0	34.0	51.8	33.0	23.8
Blast temperature	1185±175	1300±100	1275±125	1130±130	1170±80	1050±50	1050±50	1110±150	1100±150	1075±265	1100±150
Blast pressure, lb. per sq. in.	9.5–12.0	11.0–13.0	10.5–11.0	9.0	13.5–19.5	14.0–18.0	12.0–14.0	11.5	11.0	13.5	13.5
Per cent ore in burden	85.60	91.40	89.90	81.5	100.0	85.79	90.31	90.0	90.0	91.7	88.9
Per cent sintered flue dust in burden	8.38	3.45	10.10	10.8	0.0	8.17	2.14	10.0	10.0	8.3	11.1
Per cent foreign scrap in burden	6.02	5.15	0.0	7.7	0.0	6.04	7.55	0.0	0.0	0.0	0.0
Per cent SiO_2 in slag	38.56	37.54	35.24	42.60	40.44	40.20	38.80	33.40	35.6	35.8	39.93
Per cent Al_2O_3 in slag	11.40	14.45	13.34	10.34	10.10	14.05	11.54	16.00	16.20	15.30	13.31
Per cent CaO and MgO in slag	45.88	42.62	47.24	.....	45.98	42.38	47.04	48.07	45.67	47.62	37.77
Appearance in slag	.....	Acid	Basic	Acid	.....	Acid	Acid	Basic	Acid	Basic	Acid
Lbs. of slag per ton of iron	1215	1100	1108	1272	1282	1345	1070	1222	1044	1170	1205
Casting temperature of iron	.....	2617–2670	2650–2790	.....	2635–2660	2633–2710	2650–2750	2705	2783	2668	2707

tion temperature of coke 4 is 150 degrees Fahr. higher than that of coke 3, the burning rate is similar.

By blowing air faster into furnace C the rate of burden travel could probably have been increased to equal that in furnace D. On the other hand, in the case of heat 10 from furnace F we have air supplied at a faster rate than in the case of heat 6, furnace C. There were 516 pounds per hour per square foot cross-section as against 443, but the quality of coke used for heat 10 was such that the air could not be used as fast as it was supplied. Only 92.7 pounds coke per hour per square foot were burned as against 111.0 in furnace C in spite of greater air being supplied to furnace F. This results in excessive air being supplied per pound of coke burnt in furnace F. There were 6.3 pounds of air per pound of carbon against 4.27 in furnace C.

Table II

How Rate of Production Varies with Quality of Coke

	Combustibility of Coke		Pounds of iron produced per
		Total Temp.	Time in minutes for	hr. per sq. ft.
Pig lot No.	Ignition Temp.	Rise	250 ° F. Temp. Rise	area of furnace
11	860-930	269	7.0	96.2
2	930-1080	266	3.2	99.8
6	990-1070	278	2.3	135.0
7	860-915	318	2.2	179.0

The slow rate of coke consumption is responsible for the slower burden travel and also for the larger amount of air supplied per pound of iron produced. In heat 8 made in E furnace, for every pound of iron produced, there were 5.45 pounds of air used, while in heat 6 in C furnace, only 3.29 pounds of air were used per pound of iron. This air combines with carbon in a small region right in front of the tuyeres.

Table I shows also the variations in blast temperature, pressure, composition of burden, slag analysis, slag volume, casting temperature and amount of water introduced as humidity per pound of iron produced. The variation in the last mentioned item amounts to 550 per cent. This factor is very important in its influence upon coke consumption and the production of sufficient heat in the furnace. Of the eleven heats recorded here, the largest amount of water introduced per ton of iron produced was 121.6 pounds, but under some conditions it could easily amount to 200 pounds of water per ton of iron. For example, under the conditions of operation of heat 8 in furnace E, where there were 5.45 pounds of air supplied per pound of iron produced, if the humidity had been 80 per cent at 80 degrees Fahr. or 9 grains per cubic foot of air, there would have been 213 pounds of water introduced into the furnace per ton of iron produced. It is not difficult to imagine that such a quantity of water breaking up into its components, hydrogen and oxygen, and entering into the blast furnace reactions will have a pronounced effect upon the quality of the iron in addition to its effect upon utilizable heat available.

Carbon Spread Is Wide

The chemical analysis of the 11 casts of pig iron is given in Table III. An attempt was made to get all samples of iron with silicon between 2.40 and 2.60 per cent. This was not quite realized, but the analyses shown would all be acceptable for No. 2X malleable pig iron. It will be noted that lot 4 contains .066 sulphur. This was selected as an "off" or "bad" heat of iron to note its effect upon the properties of the cast iron made from it. The spread covered by the carbon contents is quite wide, reaching from 3.61 to 4.02 per cent.

Table III

Chemical Analyses of Pig Iron

	Lot Number										
Composition	1	2	3	4	5	6	7	8	9	10	11
T. C.	3.61 3.90	3.68	3.90	3.95	3.64	3.90	3.81	3.80	4.00	4.00	4.02
Mn	0.81	0.81	0.87	0.71	0.81	0.93	0.87	0.69	0.79	0.65	0.61
P	0.204	0.173	0.187	0.161	0.187	0.184	0.161	0.169	0.167	0.144	0.106
S	0.032	0.037	0.022	0.066	0.037	0.039	0.043	0.036	0.047	0.033	0.044
Si	2.50	2.50	2.45 2.50	2.34	2.59 2.41	2.44	2.70	2.50	2.33	2.63	2.42

Two distinct types of microstructure were observed in the various lots of pig iron. One type is that exhibited by lot 1 pig iron, where the primary graphite flakes are short and thick with secondary flakes fairly large and far apart. The other type is exhibited by lot 7 pig iron, in which the primary flakes are long, thin, straight, and far apart with a matrix of finely divided secondary flakes.

The types of fracture range from coarse open black fracture with large primary graphite flakes down to fine-grained gray fracture, as well as intermediate types containing patches of the fine grained structure throughout a coarse black structure.

As for dilation characteristics, it appears that there is a beginning of graphite precipitation around 1250 to 1300 degrees Fahr. upon heating, which causes an increased rate of expansion until the Ac point is reached between 1450 and 1500, at which the combined carbon goes into solution in the iron, causing a contraction before expansion is resumed. Upon cooling, more graphite precipitates out causing a marked expansion in the neighborhood of 1425 to 1450 degrees Fahr. This expansion is permanent and persists down to atmospheric temperature. The great difference in dilation characteristics occurs in the magnitude of these expansions upon heating and cooling. For instance lot 3 pig iron shows a very small expansion upon heating and a large expansion on cooling through the Ar range resulting in a permanent growth of 0.052 inch. On the other hand lot 7 shows a large expansion upon heating between 1200 and 1500 degrees Fahr. and a comparatively small expansion upon cooling through the Ar range resulting in a permanent growth of only 0.024 inch.

As already mentioned, these pig irons of known history were obtained in approximately 75 ton lots and studied one at a time by converting into cast iron and measuring various properties of that cast iron. The investigation of each lot of pig iron lasted about three weeks.

Each day there were melted about 7 to 8 tons of iron made from raw materials, 50 per cent of which was of the pig iron to be tested and the remainder of return scrap from the day before, silvery iron and steel. Most of the 7 or 8 tons of iron melted per day was cast into automobile engine flywheels. The metal used for the series of test bars poured was taken after 14 ladles of 500

pounds each had been drawn from the cupola and poured into flywheels. This precaution was taken to allow time for the cupola operation to come to more or less equilibrium after starting up effects had disappeared.

All test bars were poured as near as possible between 2425 and 2500 degrees Fahr. measured on metal running from a 500 pound ladle with a Leeds & Northrup optical pyrometer. The procedure was to obtain a full ladle and pour from it one flywheel to enable the making of a temperature determination. The first flywheel from a ladle was usually in the neighborhood of 2550 to 2575 degrees Fahr. Successive flywheels were then poured until the temperature of the metal had dropped to 2510 degrees Fahr. then the ladle was moved over to the row of test bar molds and these were poured until the metal had dropped to 2425 degrees Fahr. below which temperature the metal was used again for flywheels. In this manner all the test bars were obtained from two successive ladles near the middle of the 7½-ton cupola heat. Sample for chemical analysis

Table IV

Silicon Content

Pig lot No.	No of cast iron heats	Silicon content per cent	Variation
1	4	2.37 to 2.53	0.16
2	9	2.01 to 2.51	0.50
3	5	2.33 to 2.54	0.21
4	10	2.13 to 2.35	0.22
5	8	2.15 to 2.43	0.28
6	7	2.36 to 2.42	0.06
7	8	2.19 to 2.43	0.24
8	7	2.13 to 2.38	0.25
9	9	2.20 to 2.50	0.30
10	8	2.20 to 2.43	0.23
11	6	2.15 to 2.48	0.33

was taken from each of the two ladles used to pour test bars.

The tensile test bars were molded in a horizontal position in green sand. The ⅝-inch bars cast in pairs were fed from two shrink bobs placed so as to join the shanks of the test bars. The 1¼-inch bars were fed from a heavy riser. The bars were pulled with their cast surface intact.

The transverse test bar was made as described in A.S.T.M. standard A48-18 except that green sand was used. The transverse bars were cleaned by brushing and were loaded transversely between 12-inch centers.

Because brinell hardness is the standard of hardness in our foundries it was chosen for hardness determinations. This test bar was cast in a dry sand core mold, horizontal with the step side of the casting in the drag. This is an important factor because by casting this bar with the steps in the cope very different hardnesses result.

Three slabs of different thickness were used for the machinability test. This test consists of determining the power required to remove metal ⅛-inch deep with 0.027-inch feed at the rate of nine strokes per minute. This test was conducted on a shaper.

The fluidity test bar was copied from that described by C. Curry (Vol. XXXV, *Transactions*, A.F.A.) and was cast in a dry sand core. In testing the tendency of the iron to chill a 4 x 4 x ½-inch specimen was cast in green sand against a 4 x 4 x 2-inch chill block. The specimen was broken perpendicular to the chilled side after cooling to atmospheric temperature and measurement made of the total penetration, as well as the depth of that part of the chill which contained no gray spots.

The test sample used to measure the volume shrinkage was provided with a very thin gate and runner to the riser, so that there would be no feeding after the mold was filled. The mold was made in dry sand core and carefully measured before closing. The resultant casting usually contained a shrinkage depression at the top.

Measurements of the volume of the casting and volume of the shrinkage depression were made by noting the weight of water displaced by immersion of the casting (1) as cast and (2) with the shrinkage cavity filled with paraffin. This gave the total volume shrinkage compared with the original mold and also the volume occupied by the pipe.

Determining Linear Shrinkage

A 1¼ x 10-inch pattern and U template were used for determining linear shrinkage. The casting was poured into a dry sand core mold. Density determinations were made on a 1-inch diameter cylinder 1 inch long cut from the lower half of the transverse test bar. Samples for microstructure were taken from the 1¼ and ½-inch section of the step bar poured in core sand and from the 1¼ and ⅜-inch machinability slabs poured in green sand.

Dilation test samples were 1¼-inch diameter by 8-inch long bars with a longitudinal hole for insertion of thermocouples. The dilatometer consisted of a furnace wound with three resistors to facilitate temperature control throughout the length of the sample. Dilation of the specimen is transmitted through suitable mechanism to a roll of paper wound around a drum which is turned by an automatic Leeds & Northrup Co. temperature recorder connected to the central couple of three thermocouples inserted in the center of the test bar.

Table V

Tensile Strength

Cast irons made from pig Lot No.	Lbs. per Sq. In. tensile strength above or below average	Average tensile strength referred to, TC. + 1/3 Si = 4.05
10	+3100	32800
1	+2400	32100
11	+2200	31900
4	+2100	31800
8	+ 745	30445
6	+ 675	30375
7	.....	29700
3	—2270	26430
2	—2380	26320
9	—2400	26300
5	—4100	25600

After completing the tests, much work was done to relate test results with operating data. These results have shown us trends produced by certain causes. The sequel to this investigation should be one where the major causes of variation found in this work would be held constant in order that the effect of some of the minor causes might be studied.

The conclusion to be derived from the chill tests is that high moisture content of the cupola blast produces a heavy chill. They also indicate that with low moisture content in the blast. other influences may act to produce a heavy chill. No low values for depth of chill were obtained when the moisture content was high. It is suspected that degree of oxidation of the pig iron in the blast furnace and of the gray iron in the cupola might be an important cause of formation of white iron. but this could not be studied conveniently.

It would seem logical to expect that the amount of combined carbon present in cast iron might be determined and controlled by the same causes which affect the depth of the white iron layer produced when iron is cast against a chill. The amount of combined carbon was determined in the ⅜-inch machinability slab cast from each heat. These combined carbons were plotted against the grains of water per cubic foot of cupola blast plus one-half the grains of water per

Table VI

Rigidity of Cast Iron

Pig lot No.	Average deflection at 3500 lbs. load for TC. + 1/3 Si = 4.05
8	0.166
7	0.168
9	0.171
10	0.172
4	0.175
11	0.176
3	0.176
5	0.177
6	0.177
1	0.188
2	0.190

cubic foot of blast furnace blast. The resultant graph indicated a trend from low combined carbon and low humidity to high combined carbon and high humidity. Humidity apparently is the most important of the influences and therefore we cannot determine how much other factors affect combined carbon until we can control humidity.

Working on the theory that oxides dissolved in the pig iron due to hurried and incomplete reduction of the ore, might increase with the speed of ore travel and thus decrease the size of pipe or shrinkage cavity in the casting, the rate of travel of the ore through the blast furnace was plotted against the size of the shrinkage cavity in the top of the volume shrinkage test bar. The result indicates that the theory is correct. It is hard to decide which property is more desirable—that possessed by completely reduced iron which results in better ability to feed from the riser and gates to the casting, or that of the oxidized iron which solidifies without shrinkage cavities unassisted by feeding from gates or risers. The foundryman must decide this point, depending on his own needs.

Values of power required for machining the various cast irons plotted against hardness showed a general relation of better machinability for softer irons, but there was considerable difference in machinability of different cast irons of the same hardness. Resorting again to the moisture content of the blast, machinability of the ⅝-inch slabs was plotted against moisture content of the blast, plus one-half of the moisture content of the blast furnace blast during the manufacture of the pig iron used. The majority of the points suggest better machinability for dryer blast. Also it is evident that well deoxidized pig iron makes cast iron which machines better, that pig iron produced too fast makes cast iron which is difficult to machine, and that when referring to cast irons made from the same pig iron and under like cupola conditions, softer irons machine better.

The original program of investigation assumed we would be able to make cast iron consistently within a narrow range of silicon content. We discovered the interesting fact that it was possible to do this while using some pig irons, but with the use of other pig irons the silicon varied considerably. This variation cannot be attributed to any variation of the silicon in a given lot of pig iron, because each lot of pig iron obtained was all from one cast and analysis of several pigs from one lot showed very close agreement with not more than 0.11 per cent variation. Table IV shows how the silicon content varied in the cast irons made from those pig irons.

The variation in silicon content was used to study the hardness variation. Graphs were plotted between brinell hardness versus silicon content for each group of cast irons made from one pig iron. All curves obtained between silicon content and brinell were very irregular. The most striking fact presented is the big variation in brinell hardness for irons of like silicon content and size section. Here is iron of 2.20 per cent silicon made from pig iron lot 3 cast in 1¼ section of dry sand, giving a hardness of 165, while iron of the same silicon made from pig iron lot 9 and also cast in 1¼-inch section in dry sand, is 192 hard, a difference of 28 points. The difference is greater in irons containing higher silicons. Iron of 2.50 per cent silicon made from pig lot 7 gives 178 hardness in 1¼-inch section cast in dry sand, while iron made from pig lot 4 cast under the same conditions gives a 145 brinell, a difference of 33 points. Variations of the same degree exist in cast irons poured in the green sand molds. What causes this difference is a matter of speculation.

As a means of comparing tensile strengths of the various cast irons on a uniform basis, tensile strength of the ⅝-inch as cast bars were plotted against a composite factor of

(*Concluded on Page* 999)

Table VII

Summary of Principal Conclusions

1. Physical characteristics of pig iron persist through the cupola melting operation and are conferred upon the cast iron to which it is converted.
2. The formation of iron carbide is apparently fostered by the presence of moisture in the blast. The quantity of combined carbon formed increases with increase of water in the blast.
3. Properties of the cast iron which are dependent upon the amount of combined carbon present and upon the ease with which combined carbon is retained by rapid cooling are, therefore, related directly to amount of moisture in the blast.
4. Machinability of cast iron improves with diminishing quantities of moisture in the blast.
5. Tendency for the formation of white iron diminishes as the moisture content of the blast is reduced.
6. Tendency for the formation of shrinkage cavities is decreased by increasing the rate at which the ore burden travels through the blast furnace.
7. The rate at which the burden can be made to travel through the blast furnace depends upon the burning rate of the coke used.
8. A cast iron of a given analysis, such as total carbon, 3.30; manganese, 0.50; phosphorus, 0.15; sulphur, 0.085; and silicon, 2.35, poured in dry or green sand, other conditions being constant, will vary in hardness 25 to 30 points of brinell hardness; depending upon the quality of the pig iron used in the charge.
9. In a cast iron of above analysis a variation of silicon from 2.20 to 2.50 per cent silicon, other conditions being constant, will produce a drop in hardness from 5 points brinell to 30 points brinell, depending upon the quality of pig iron used in the charge.
10. The factors responsible for variations of tensile strength are not revealed by the investigation. It can be said, however, that the tensile strength is influenced to a marked degree by the pig iron.
11. Machinability is improved by use of pig iron which has been completely reduced in the blast furnace and is made more difficult by too rapid progress of iron through the blast furnace.
12. The quality of the coke used in a blast furnace affects the pig iron in several ways making it extremely important to have accurate control of this material.

Degasifying Process Facilitates Thick Impervious Plating

Crystals of Coating Are Interlocked with Those of Base Metal to Form Intercrystalline Bond

By F. M. Dorsey

President, Metal Protection Co., Cleveland

CORROSION not only is responsible for enforced replacements at high costs, but often is the indirect cause of even greater losses, many of which are irretrievable, as for example, when oil well pipes corrode in a manner to cause the entire loss of the well.

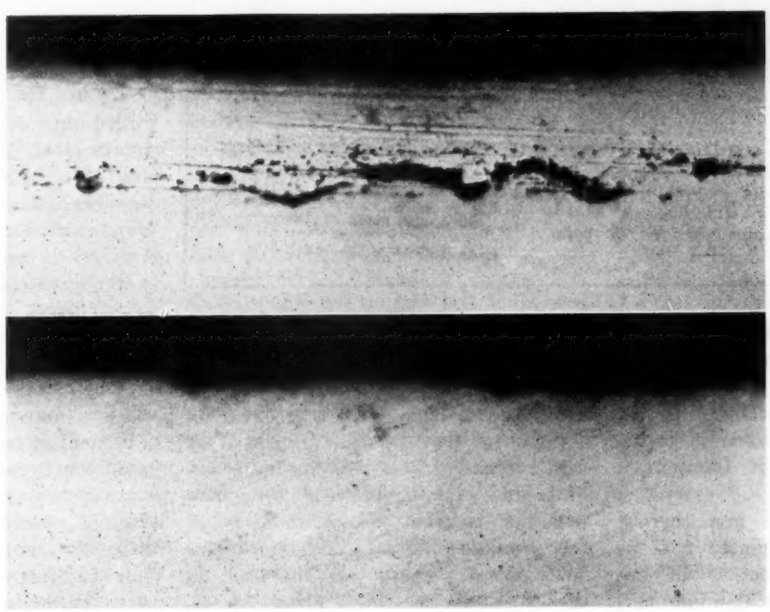
Notwithstanding rapid development of alloys, particularly for the chemical field, the protection against corrosion in which the greatest reliance is placed, if measured by volume of materials used, is coatings. Under this heading must be listed the extensive variety of paints, lacquers, oils, greases, slushing compounds, and similar dopes, among which are found representatives of the entire range of substances which of themselves or in solution can be made to form some sort of film intended to protect the underlying materials. There is also the extensive assortment of metals used as coatings, ranging from the base and common metals to those classified as noble and rare.

The metallic coatings, as compared with alloys, have some advantages. They provide a higher concentration of the resistant material, such as nickel or chromium, at the surface where protection is needed. They also afford means for securing a larger variety of finish and color where these are important for decoration, and both the ease and speed of application are favorable factors in cost of manufacture. Metallic coatings may be applied in a liquid vehicle, examples being the bronzes, which are on the borderland between metallic coatings and paints. They may be applied by hot processes, such as tinning and galvanizing. They may be sprayed in the molten condition. "Close plating," in which thin sheet, formed to fit the base metal exactly, is soldered in position, is still used but the great volume of work concerns the electrodeposition of some one of the protecting metals.

These advantages of plating are somewhat offset by the fact that until chromium became available as a metal to be deposited by electrolytic means, plated surfaces were not satisfactory from the standpoint of friction wear. Many forms, shapes and sizes cannot be plated satisfactorily. There also has been the disadvantage as compared with alloys that plated metals could not be worked, that is, rolled, bent and otherwise manipulated for fabrication. This was due principally to imperfect adherence, and this same fault made it difficult to put on a sufficiently heavy coat of protecting metal to perform satisfactorily under severe service conditions. Thin coatings, that is, two-tenths of a mil, can easily be made to adhere, but difficulties increase as the thickness of the plate increases, and with chromium, for example, substantial coatings cause the underlying coat of nickel necessary to hold the chromium in the first instance to peel from the base metal. Another disadvantage of plating has been the great difficulty of securing a really continuous protecting film. The polarization gases, the presence of organic materials in the plating bath, and similar causes have contributed to pitting and pin holes where after a time centers of corrosion have become manifest. Many of the disadvantages of a plated surface may

Treats Base Metal Before Coating

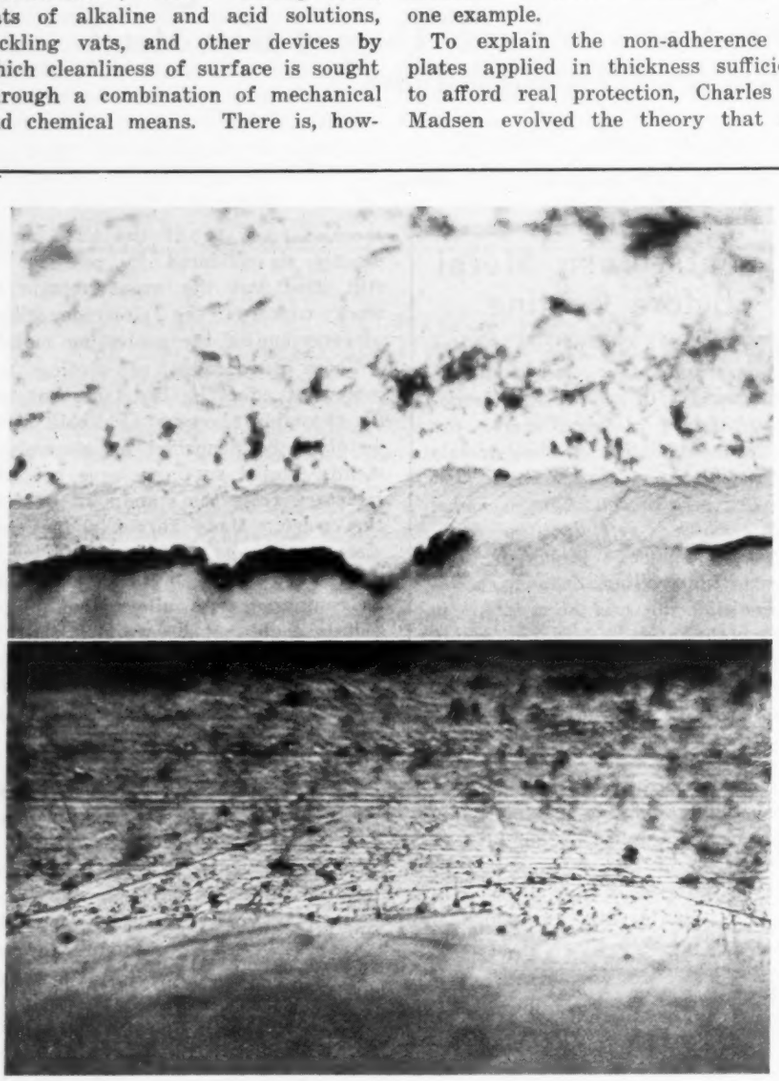
THIS is the first of two articles describing the commercial development of a process for the degasifying of metals and for the subsequent plating of these metals to produce a protective metal film. Under certain conditions a nickel plate which is soft, ductile and annealable may be produced thus permitting rolling, drawing, welding, soldering and other steps in the fabrication of plated metal. The next installment, in which the author discusses the preparation and control of the plating bath, will be presented in an early issue.



Cold-rolled steel not treated, coated with 0.002-inch nickel, is shown above. X 1000. Sample not etched. The bottom view shows cold-rolled steel in the treated state and with a nickel coating of 0.002-inch. X 1000. Sample not etched

be traced to nonadherence. It has long been recognized that the surfaces of the metal to be plated must be chemically clean, and in the plating room are to be found hot and cold running water, cyanide baths, electric cleaning baths, vats of alkaline and acid solutions, pickling vats, and other devices by which cleanliness of surface is sought through a combination of mechanical and chemical means. There is, however, a factor in adherence not touched by any of the ordinary methods. This is the gas absorbed upon the surface of the metal or occluded in the metal and believed by some to represent another example of Langmuir's one-molecule-thick layer, extending over the entire surface and thereby causing any ordinary plated coat to be more or less defective in adherence. Gases, in metals, like corrosion, are known to be a cause of trouble and research is under way in more than one center looking to the elimination of occluded and absorbed gases. Most of the work is directed toward the elimination of occluded gases during the process of metal manufacture, and it has been shown that a reduction in gases in metals contributes materially to adherence of vitreous enamels, to cite one example.

To explain the non-adherence of plates applied in thickness sufficient to afford real protection, Charles P. Madsen evolved the theory that ordinary plates follow the surface crystal structure of the steel or equivalent bases to which these coatings are applied, and that they tend to adhere to the separate crystals at the surface. This would leave infinitesimal spaces between the plate and the base at the boundaries of the crystals on the surface of the base metal. With an increase in the thickness of the coating up to, say, 0.0005 to 0.11110-inch in thickness, the plate then tends to assume its own physical form, building up its own crystal structure in the surface of the base metal. As the coating becomes more of a unit, the tendency is to draw away from the base metal, resulting in peeling which is so well known in every plating room.



Cold-rolled steel not treated, coated with 0.0005-*inch nickel on steel and* 0.002-*inch zinc on untreated nickel surface is shown above. X* 1000. *Sample not etched. Bottom view shows cold-rolled steel treated and coated with* 0.0005-*inch nickel on steel and* 0.002-*inch zinc on nickel surface. X* 1000. *Sample not etched*

The method for preparing the base metal such as iron or steel comprises using this metal as the anode in a bath of 66 degrees Be. sulphuric acid at ordinary temperatures. The cathode may be either the steel tank in which the acid is contained or another sheet of steel. This is not, strictly speaking, an electrolytic cell, and the sulphuric acid is not an electrolyte. Acid of less than 85.4 per cent does not work satisfactorily, and while fuming sulphuric acid could be used, it is impractical to handle acid of a greater strength than 98 per cent. The commercial 96 per cent or 66 degree Be. acid is satisfactory.

The electrical characteristics of this cell and its operation are interesting. The cell requires 24 volts which may be either direct or alternating current, and a resistance always must be found in series with the cell, the amount of the resistance depending upon the size of the object which is the anode, the carbon content of the steel treated, and the exact strength of the acid. Of these factors the size of the object is the most important, with the carbon content of the steel the next. The cell can be controlled by using an ammeter and controlling the current in terms of amperes per square foot, in which case the area of the anode or work must be known. While this is sometimes difficult to determine, it is a necessary step, especially where objects afterward are to be coated with nickel, chromium, etc., to a definite thickness. When the cell is controlled by current, 50 ampere per square foot is on the average the best rate. For low-carbon steels 25 amperes per square foot has been found sufficient, but for high-carbon steel, such as tool steel, the higher current rate is necessary. When using direct current, the cell is always ready to operate but when using alternating current, the steel cathodes must first be passivated, using a dummy anode.

The object connected as anode should enter the degasification bath with the current on and the approximate resistance necessary for the object therefore must be predetermined. This is learned by experience and with the help of a test piece. The current potential crossing the cell drops at approximately three stages. The initial current for which the cell is set with resistance should re-

main nearly constant for 10 seconds, then drop to about one-third of its original value. It should then drop slowly during the next 45 to 65 seconds to about one-tenth of its original value. Therefore, the current should drop still lower but more slowly, coming to substantially zero at the end of 3 minutes. In some cases, as with steel containing excessive gas, it is helpful to raise the object completely out of the cell and drop it back again in a different part of the solution with the current still on.

As in other electroplating operations, the object must be prepared before degasification. In practice, it is put through all of the cleaning operations of the established plating art. The degasification cell does not attack appreciably or remove any oxides or rust, which makes it necessary to use the ordinary pickling bath. Excessive grease is removed by washing with benzol or other solvents. Traces of grease then are removed in the alkali electric cleaner.

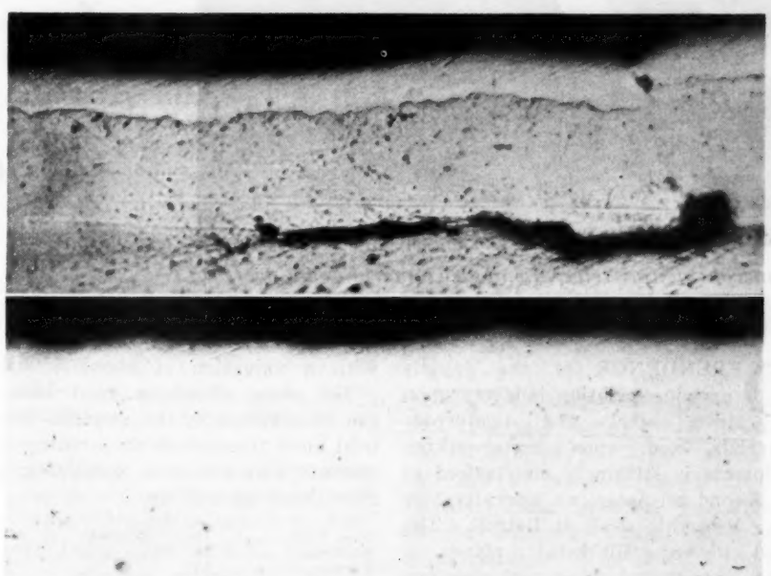
After degasification, the most vital factor upon which the success of the treatment depends is the complete removal of the acid of the bath from the object before it passes on to the plating bath proper. For flat work, rinsing with water under 100 pound pressure is satisfactory, but small and intricate objects are best treated by thorough agitation in a trough of running water. Theoretically, the ideal method of removal would be to dip the object in a strong alkaline solution such as 25 per cent ammonia, but this is not practical, due to the development of rust spots on the object. These can be removed by a quick dip in the acid pickling, which is 7 per cent sulphuric acid maintained at a temperature of 180 degrees Fahr., but further rinsing is obviously then necessary.

Treated objects should be put into the plating bath as quickly as possible to avoid the formation of rust which interferes with adherence. Degasified metal can be coated with any of the metals used in the plating art and any base metal, with the exception of aluminum, can be given the degasification treatment with success. While zinc and lead can be deposited successfully on such treated metal most of the work done thus far has involved copper, nickel and chromium. Hot coating, as with zinc, also has been practiced, and experiments with vitreous enamels show remarkable success in obtaining a satisfactory adherence. For much work a great advantage lies in the ability to work the plated metal by rolling, drawing, bending, etc., and by forming in dies—a process largely in vogue for the fabrication of many sheet metal parts. It therefore was desirable to perfect a method for coating soft nickel upon the degasified base metal. This has been accomplished in a special bath, composed of nickel sulphate, 300 grams; nickel chloride, 25 grams; boric acid, 40 grams; and water, 1 liter. The bath is prepared by adding the nickel sulphate and chloride to cold water, using only sufficient heat to insure solution. After filtering the boric acid is added, the solution heated and stirred until it is dissolved, when it is allowed to cool. At this point, 250 cubic centimeters of a stock solution of nickelous hydrate for each 20 liters of bath, are added, as well as 2 cubic centimeters of 3 per cent hydrogen peroxide for each liter of bath. The bath then is heated slowly, stirred frequently, brought to boiling, allowed to boil for 5 minutes, then chlorinated for 5 minutes, and filtered. This is the stock solution for the soft nickel bath.

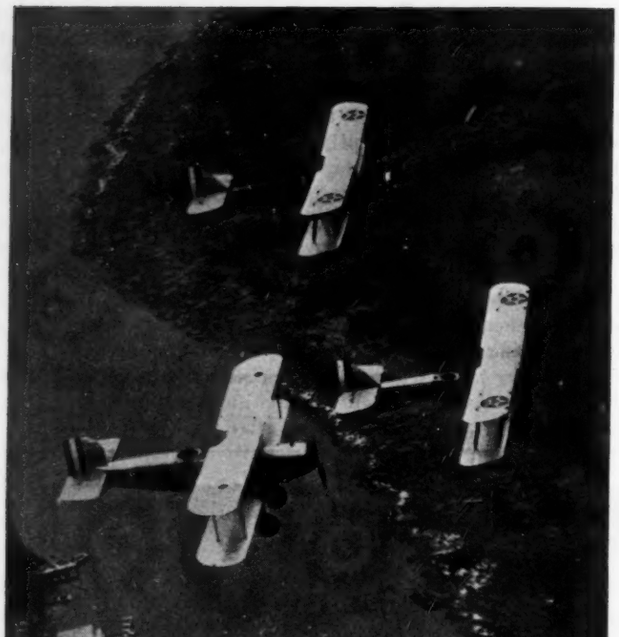
The nickelous hydrate mentioned is prepared by dissolving 300 grams of nickel sulphate in a liter of water, warming if necessary, and then cooling. Forty grams of chemically pure sodium hydrate then are dissolved in another liter of water, the two solutions are mixed and filtered. The precipitated nickelous hydrate then must be washed with water until the flame test shows the absence of sodium. The precipitate is reduced to a thick cream with water and placed in jars.

Another important reagent is the indicator used to determine the acidity of the bath, for as will be seen presently, the acidity is one of the important factors in producing a plate of soft, adherent, annealable, ductile nickel. In the preparation of the indicator, the vessels used must be thoroughly sterilized; 1/10-gram bromo thymol blue is rubbed in a sterilized mortar with 3.2 cubic centimeters 1/20 N sodium hydrate, to which is then added 250 cubic centimeters of distilled water. A determination of acidity with this indicator requires the use of only sterilized vessels and pipettes which must be sterilized daily in boiling distilled water. To use the indicator 20 cubic centimeters of distilled water is placed in a 50 cubic centimeters Nessler tube, and to this is added a 1 cubic centimeter sample of electrolyte. About ½ cubic centimeter of the indicator is now added, the contents of the tube shaken, and the acidity determined by color.

Peacock blue signifies basic, sky blue neutral, turquois blue approximately 5 milligrams of acid per liter, grass green 10 milligrams of acid per liter, light green 50 milligrams per liter, canary yellow and higher concentration of acid. The measurements of reagents and electrolyte to be tested should be made in calibrated pipettes and not in graduates.



Cold-rolled steel not treated, coated with 0.002-inch nickel and 0.0002-inch chromium on untreated nickel surface is shown above. X 1000. Sample not etched. Bottom view shows cold-rolled steel treated and coated with 0.002-inch nickel and 0.0002-inch chromium on treated nickel surface. X 1000. Sample not etched



Transcontinental trips are made sometimes by fleets of airplanes

Second All-American Aircraft Show Reflects Increasing Use of Metal

DEPENDENCE of the rapidly growing aviation industry upon iron, steel and nonferrous materials and upon metalworking equipment is strikingly emphasized at the second all-American aircraft show being held this week at Detroit. The trend toward "all-metal" planes is more pronounced than in previous exhibitions and the development of structural materials, airplane parts, hangar construction and landing field accessories of metal is everywhere apparent.

The exposition, which is sponsored by the Aeronautical Chamber of Commerce of America and the Detroit Board of Commerce, is being held in Convention hall. It opened April 6 and will continue until April 14. The first all-American show was held at Bolling field, Washington, in May, 1925. The third show is scheduled to be held at the city airport municipal hangar in Detroit, in 1930.

The current show is perhaps the largest of its kind held in this country. More than 200 companies are exhibiting their displays occupying 166,000 square feet. Numerous companies which were unable to obtain accommodations in Convention hall are exhibiting in hotel lobbies in the downtown area of Detroit. Of the exhibitors 66 are manufacturers of aircraft who are showing 105 models valued at approximately $1,000,000. Accessory manufacturers, numbering 134, are displaying materials and parts with a valuation of about $500,000.

The show affords a good idea of the distribution of the airplane industrial units throughout the country. The aircraft manufacturers exhibiting are distributed as follows:

New York	18	Nebraska	2
Michigan	14	Arkansas	2
Kansas	14	Minnesota	2
Ohio	11	Oklahoma	2
Missouri	10	Connecticut	2
Illinois	8	Delaware	1
Pennsylvania	3	Washington	1
California	3	Indiana	1
Maryland	3	West Virginia	1
Wisconsin	3	Quebec	1
Colorado	2		

New York also leads in the number of manufacturers of materials and accessories for aircraft. Exhibitors of these products are distributed as follows:

New York	40	Wisconsin	2
Michigan	30	Indiana	2
Ohio	20	Massachusetts	1
Illinois	10	Texas	1
New Jersey	7	Kansas	1
Pennsylvania	7	Tennessee	1
California	4	Oklahoma	1
Missouri	3	Ontario	1
Connecticut	3		

That more attention is being given to the design of hangars is evidenced by the displays of builders and engineers specializing in this work. The Austin Co., Cleveland, is showing a lighted model of a modern airport and illustrating the features of many structures it has designed and built for the industry. The Esline Steel Building Co., Detroit, is exhibiting a model of a hangar of its design. The International Derrick & Equipment Co., Columbus, O., is displaying models of its standardized steel airport buildings and hangars, as well as hangar doors, beacon towers, mooring masts, ground light supports and radio towers. H. H. Robertson Co., Pittsburgh, is demonstrating the uses of its protected metal roofing and siding, ventilators, skylights and sash. Detroit Steel Products Co., Detroit is exhibiting hangar doors and windows of steel.

Among the builders of aircraft engines represented are a number whose names are familiar in the metalworking industry. Among these are Axelson Machine Co., Los Angeles; E. W. Bliss Co., Brooklyn, N. Y.; LeBlond Aircraft Engine Co., Cincinnati; and Pratt & Whitney Aircraft Co., Hartford, Conn. Parts for airplane engines are being shown as follows:

Aluminum pistons, by Aluminum Industries Inc., Cincinnati; cylinder heads and other castings, Bohn Aluminum & Brass Corp., Detroit; magnesium metal castings, Don Chemical Co., Midland, Mich.; forgings, Endicott Forging & Mfg. Co., Endicott, N. Y., and Wyman Gordon, Worcester, Mass.; anti-friction bearings, Norma-Hoffman Bearings Corp., Stamford, Conn., and S. K. F. Industries Inc., New York; and cam and tappet rollers, piston pins and other engine parts, Ex-Cell-O Tool & Mfg. Co., Detroit.

Manufacturers of structural members and bracing for aircraft who are represented include the Macwhyte

Exhibitors of Materials and Accessories at Aircraft Show

Aluminum Industries Inc., Cincinnati
Austin Co., Cleveland
Axelson Machine Co., Los Angeles
E. W. Bliss Co., Brooklyn, N. Y.
Bohn Aluminum & Brass Corp., Detroit
Buhl Stamping Co., Detroit
Cleveland Pneumatic Tool Co., Cleveland
Crouse-Hinds Co., Syracuse, N. Y.
Dayton Mfg. Co., Dayton, O.
Detroit Steel Products Co., Detroit.
De Walt Products Corp., Leola, Pa.
Eclipse Machine Co., East Orange, N. J.
Endicott Forging & Mfg. Co., Endicott, N. Y.
Esline Steel Building Co., Detroit
Ex-Cell-O Tool Co., Detroit
General Electric Co., Schenectady, N. Y.
Haskelite Mfg. Co., Chicago
International Derrick & Equipment Co., Columbus, O.
Lee Machinery Co., Detroit
Linde Air Products Co., New York
Mac Whyte Co., Kenosha, Wis.
Michigan Screw Co., Lansing, Mich.
National Steel Products Co., Dayton, O.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Oakite Products Inc., New York
H. H. Robertson Co., Pittsburgh
Rome Wire Co., Rome, N. Y.
John A. Roebling Sons Co., Trenton, N. J.
S. K. F. Industries, New York
W. J. Savage Co. Inc., Knoxville, Tenn.
Snap-on Wrench Co., Detroit
Standard Steel Propeller Co., West Homestead, Pa.
Stewart Hartshorn Co., New York
Summerill Tubing Co., Bridgeport, Pa.
Taylor Instrument Co., Rochester, N. Y.
Van Dorn Electric Co., Cleveland
Edgar T. Ward's Sons Co., Pittsburgh.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilson Steel Products Co., Chicago
Wyman Gordon, Worcester, Mass.

Co., Kenosha, Wis.; John A. Roeblings Sons Co., Trenton, N. J.; Stewart Hartshorn Co., New York; Summerill Tubing Co., Bridgeport, Pa.; and Edgar T. Wards' Sons Co., Pittsburgh.

The Bendix Brake Co., South Bend, Ind., is displaying airplane wheels and brakes. The Buhl Stamping Co., Detroit, is showing a complete line of aircraft stampings including exhaust manifolds, gas tanks, air scoops, nose cowling, etc. The Cleveland Pneumatic Tool Co., Cleveland, is demonstrating pneumatic shock absorbing struts for landing gear. Samples of composition sheets in which aluminum, duralumin, etc. are used with wood for flooring and lining of fuselages are displayed by the Haskelite Mfg. Corp., Chicago.

Starting devices are exhibited by the Eclipse Machine Co., East Orange, N. J., and Heywood Starter Corp., Detroit. Aircraft hardware, a recently developed commodity, is featured by the Dayton Mfg. Co., Dayton, O., and National Steel Products Co., Dayton, O.

Among the manufacturers of equipment for airplane factories and for serving and repairing aircraft are the Snap-On Wrench Co., Chicago, which is displaying a complete line of special wrenches for aircraft work; Van Dorn Electric Tool Co., Cleveland, with electric drills, grinders, valve refacers and reseating cutters, etc.; De Walt Products Corp., Leola, Pa., which is demonstrating a metal cutting machine; and the W. J. Savage Co., Knoxville, Tenn., which is exhibiting three gray metal cutters.

The absence of many producers of alloy steel parts, bolts, nuts, screw machine products, etc., is partially explained by the fact that many of these products are handled through airplane supply houses, a number of which are represented at the show. Among these dealers are the Aero-Supply Mfg. Co., College Point, N. J., and Johnson Airplane & Supply Co., Dayton, O.

Electrical equipment for aviation use is shown by the General Electric Co., Schenectady, N. Y., and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

The principal manufacturers of metalworking equipment, parts, materials and accessories are listed in the accompanying table.

An elaborate program of meetings is being conducted in connection with the show. Tuesday, April 9, "Engineers Day," was devoted to meetings of various committees and to a joint technical session at the Book-Cadillac hotel in which the Aeronautical Chamber of Commerce and Society of Automotive Engineers participated.

Eyesight Council Elects Officers for 1929

Lawrence W. Wallace has been re-elected president of the Eye Sight Conservation Council of America, an organization which is conducting a nation-wide movement for better vision in industry and education. Mr. Wallace is executive secretary of the American Engineering council and a past president of the Society of Industrial Engineers. Other officers selected for 1929 are as follows: Vice president, Bailey B. Burritt, New York; general director, Guy A. Henry, New York; and treasurer, William R. Wall, New York. James J. Davis, secretary of labor, Washington, was named a member of the board of councillors. Headquarters of the council are in the Times building, Forty-second street and Broadway, New York.

Explains General Electric Incentive Plans

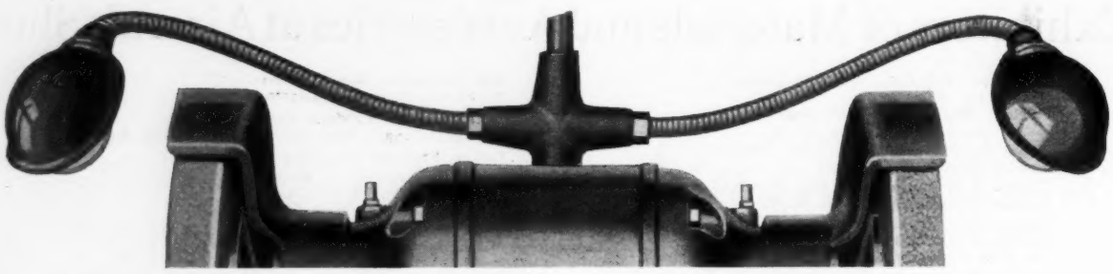
How employes of the General Electric Co., Schenectady, N. Y., are paid for results instead of merely for the time they put in was told in the annual report of Gerard Swope, president of the company, in his annual report for 1928.

Modifications of the piece-rate system, such as the differential piece-rate, task and bonus, group incentive and others, have been introduced, Earnings of workers are studied to identify those making the highest earnings and to give them still greater opportunities. Employes excepting those in high salaried positions, with five or more years of service, are paid supplementary compensation of 5 per cent of their annual earnings.

Employes in important and supervisory positions in all departments, including administrative, engineering, manufacturing and sales, are formed into groups having a common interest in and responsibility for the results obtained. At the end of the year an extra compensation fund for each group is calculated upon the results.

Coal Stocks Unchanged

Stocks of anthracite and bituminous coal at industrial plants in the United States and Canada as of Feb. 1 totaled 41,000,000 tons, approximately the same as on Jan. 1. Consumption in January was about 1,000,000 tons higher than in December, according to the National Association of Purchasing Agents. The average day's supply of coal on hand at industries dropped from 34 to 32 tons. As of Feb. 1 steel mills in the United States and Canada had an average supply of 31 days of bituminous coal, by-product coke plants had 29 days, railroads 25 days and electric utilities 51 days.



Flexible armored cable is used extensively in machine tool installations

Large Uses of Steel in Small Ways

138th Article—Flexible Conductors

FOR every pound of copper used in the electrical wiring system of a modern house at least ten pounds of steel is required. The day of open wiring has passed and all modern installations call for steel armor of one form or another to protect the electric conductors. Rigid steel conduits in the form of butt welded tubing are used extensively, though considerable labor is required in pulling the conductors through them. Another type is known as flexible armored cable, and because of the ease with which this may be installed it is coming into extensive use, especially for residential work. This cable is made by covering the usual pair of insulated conductors with an overlapping, spiral coat made from strip steel.

The original design of flexible steel coated cable had two layers of steel, consisting of an inner left-hand spiral and an outer right-hand spiral. The single spiral is of comparatively recent design, but production has increased rapidly until now more than 90 per cent of the flexible armored cable is of this type, and the annual tonnage of steel required for its manufacture exceeds 25,000 tons.

In the making of the flexible conductors strip steel is passed through two sets of rolls. The first set forms it longitudinally, approximately one-half the width of the strip being of convex section and the other of concave section. The second set of rolls forms the spiral over the insulated wires which are fed in from a bobbin. The whole process is automatic and appears simple, though many difficult engineering problems had to be solved to make it practical.

To form the spiral it is necessary either to revolve the cable as it is being covered or else to revolve the forming rolls and the spool containing the strip steel. Both of these methods are used. The first is the simplest and is used for all ordinary sizes. When the flexible tubing is to be 2 inches or more in diameter the second method is employed. With the first method the strip is fed from large spools, held on a support at one side of the machine. The conductors which are to be covered are on another spool at the top of the machine. The spool revolves in synchronism with a revolving cylindrical steel box or receiver into which the completed cable is fed.

At one large eastern plant a whole building is filled with these automatic armoring machines, and the production of flexible armored cable and flexible steel conduits from this one plant runs close to 10,000,000 feet a year. Flexible steel conduit is similar to the armored cable except that it is made up as a tube intended to be installed first and have the conductors pulled in afterwards.

The strip steel used for this armoring is purchased from the steel mills in the exact sizes required and already galvanized. Some steel companies market this product as flat wire and it is frequently spoken of as conduit wire. It is a high-grade, basic, low carbon, cold rolled strip, electrically galvanized to meet underwriters' specifications. Production of flexible armored cable, and of this special strip, is moving rapidly upward, and manufacturers predict that the total output for 1929 will exceed 30,000 tons.

THIS is the one hundred thirty-eighth of a series of articles dealing with some of the obscure uses of steel which go far toward absorbing the American tonnage.

Among articles appearing every two weeks and not included in Vol. I containing 51 separate descriptions are:

Swords	*Bathroom Fixtures*
Paving Guards	*Snow Fences*
Reaction Kettles	*Stairs*
Fire Screens	*Cork Screws*
Voting Machines	*Universal Shafts*
Display Racks	*Sewing Machines*
Steel Stamps	*Lanterns*
Wire Screens	*Cleats*
Typewriter Spools	*Axes*
Chain Hoists	*Steel Ceilings*
Newspaper-Vending Boxes	*Card Tables*
Wire Lamp Shades	*Welding Rods*
Belt Fasteners	*Washing Machines*
Sap Spouts	*Resilient Road Guards*
	Screw Drivers
	Windows

Tests Welding Wire for Endurance Limit

To determine the endurance or fatigue limits of the various wires used in welding work, tests now are being made at the Rensselaer Polytechnic institute, Troy, N. Y., under the direction of T. R. Lawson. The method of procedure is to take specimens of the wire and build up a pile of welded material from which sample rods are turned for tests in the Moore-type endurance machine. The work is being carried on under the auspices of R. A. Weinman of the General Electric Co., who will prepare a paper describing the results after some further progress has been made.

Fuels Meeting Date Set

The third national fuels meeting held under the auspices of the American Society of Mechanical Engineers will take place this year from Oct. 7 to 10 at Philadelphia. F. M. Van Deventer, engineer, Henry L. Doherty & Co., New York, will serve as chairman.

New Books Worth Reading

SCIENCE ECONOMICS BUSINESS

Statistics of the Iron and Steel Industries (1927), compiled by the National Federation of Iron and Steel Manufacturers, of Great Britain; 161 pages, 6¾ inches x 9⅝ inches; paper; supplied by IRON TRADE REVIEW for $1.50, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 5s 4d, postpaid.

The National Federation of Iron and Steel Manufacturers, of Great Britain, has just issued its annual "Statistics of the Iron and Steel Industries" covering 1927. The new edition follows in the main those issued in the past few years, but further additions have been made to render these statistics as complete as possible.

Attention is particularly drawn to the iron and steel tariff section which was inaugurated in last year's edition and which has been considerably enlarged. The 1926 statistics began by giving the tariff for Canada, India and Australia, and the tariff section for that year contained nine pages. In this year's edition the tariff section contains 34 pages and includes Australia, Belgium, Brazil, Canada, France, Germany, India, Italy, Japan, New Zealand, South Africa and the United States.

In the section dealing with iron and steel statistics of the United States, the historical tables relating to production of pig iron and steel have been amplified. In the case of Germany, the table showing a comparison of exports by markets has been enlarged and gives greater detail than heretofore. A new table has been added to the Luxemburg section giving the value of the output of finished steel by product. New sections have been included dealing with Russia, Austrial, the Netherlands and Switzerland.

Tables of world production of pig iron since 1866 and steel since 1868 have been brought up to date, and in addition a table gives world output of iron ore for the last few years.

With regard to the United Kingdom, production statistics are based upon returns supplied by iron and steel manufacturers throughout the country; owing to their co-operation, the figures now are more complete than at any other period. Returns of pig iron production are received from all makers without exception, and in the case of steel, from all manufacturers of steel ingots.

* * *

What Government Costs

Cost of Government in the United States 1926-27. 109 pages, 6 x 9 inches; published by the National Industrial Conference Board and supplied by IRON TRADE REVIEW for $2.50, plus 15 cents for postage.

Factual information is supplied in this report on which to evaluate the soundness of public financial policies from local and state to federal government units. It gives a detailed picture of expenditures, taxation and indebtedness, of the amount of money collected, spent and borrowed by all agencies, cities, counties, school districts, state and federal government.

A previous volume covering 1925-26 is brought to date and expanded in this volume.

* * *

Pushing Back the Horizon

Industrial Explorers, by Maurice Holland; cloth, 347 pages, 5½ x 8½ inches; published by Harper & Bros., New York, and supplied by IRON TRADE REVIEW for $3.00, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 16s.

As director of the division of engineering and industrial research of the National Research council Mr. Holland has had unusual opportunities for knowing his subjects. They are nineteen men who have pierced the curtain limiting knowledge on some one of its frontiers and have brought back new knowledge of value to mankind. The sketches are done lightly and entertainingly without an effort to be technical.

The reviewer found his wife reading the volume because there was a chapter on Samuel C. Prescott, who searched and found the best method of making a cup of coffee. In metallurgy iron and copper have their representatives, bakelite, leather, dynamite, concrete and other industries have been benefited by the genius of men who devoted time and study to developing research in their various channels.

The book is as interesting as fiction, but is all facts. It will repay reading by those who are interested in knowing how some of the common blessings of life did not just happen to be, but were searched out and made to serve mankind because some man devoted himself to asking nature questions and broke through into the bright light of knowledge.

* * *

Harnessing of Electricity

Electric Drive Practice, by Gordon Fox; cloth, 421 pages, 5½ x 8 inches; published by McGraw-Hill Co. Inc., and furnished by IRON TRADE REVIEW for $3.50, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 17s 6d, net.

This book explains the principles, construction and performance of all types of motors and controllers in commercial use, for direct and alternating current. Various types are explained, their best application described and reasons given for choice. Characteristics of each motor type are described, control equipment specified and performance charted.

Explanatory drawings and diagrams illustrate the text. It is designed for operators, buyers, sellers, manufacturers, designers and others interested in motors and controllers.

The volume deals with those classes of driven machinery in common use in many industries. Each class of machinery is discussed in detail as a premise to proper motor application. The book thus becomes a reference on machinery characteristics and is not purely an electrical text.

One chapter is devoted to the principles of motor selection, another to mechanical aspects of motor installation and considers various media between motor and machine, and another considers motor installation construction from an electrical viewpoint.

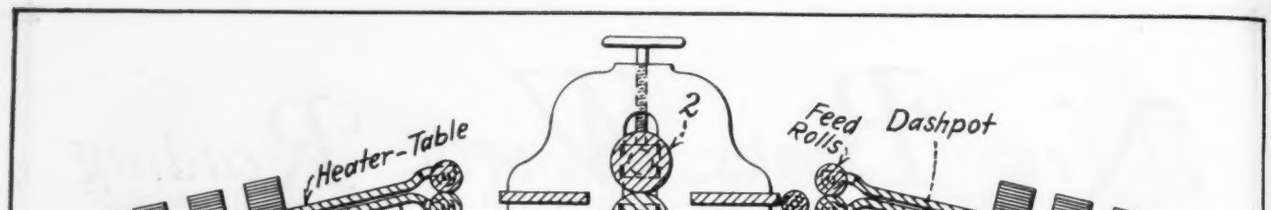


Fig. 1—Elevation of twin-staggered sheet mill which may be used either for roughing or finishing

Reversing Sheet Mill Designed to Eliminate Heat Losses

By Leon Cammen

A REVERSING 2-high mill, which with a crew of three men will roll in excess of 2 tons of sheet steel an hour, now is under construction in this country. In this mill roughed sheets are supplied to the left hand end of coil designated *A* in Fig. 2 which is a high-frequency reheating coil of the type described in IRON TRADE REVIEW July 26, 1928, page 194. The sheet then is conveyed to the 2-high mill, *D*, where it is reduced and also cooled by contact with the rolls. The heat thus lost is restored in coil *B* which the sheet passes on the way to stand *E* placed in tandem with *D*. Thus far the process is conventional, but from stand *E* the sheet goes to coil *C* where it is reheated, and then the direction of motion of both sheet and rolls is reversed. This necessitates some important modifications in the design of the mill auxiliaries.

Screwdown Operated Electrically

Rolls *D* and *E* are provided with electrically-operated screwdowns so controlled as to reduce the distance between the rolls a predetermined amount after each pass. Even with fast rolling, there is enough time to do the roll shifting, and fortunately, no new problems in the design of the screwdown gear were involved, as electrically controlled screwdowns have been common practice for some time, though not usually in sheet mills. The unit now under construction is designed to take a sheet at 12-gage, and after six passes discharge it at 22 gage. The reversal of the motion of the rolls is controlled by the same gear as the screwdowns, while the input of heat into the coils is controlled manually.

Contrary to the usual sheet practice, the amount of labor involved is remarkably low. One man feeds the roughed sheets into the receiving end of coil *A*, while two men stand at the rolls, one at each set, watch the rolls, and from time to time move a lever to increase or decrease the sheet temperature. The present estimate is that the mill now under construction will turn out 2½ tons an hour of sheets rolled from 12 to 22 gage, and will do it without speeding up. This is equivalent to two and a half turns of the present finishing mill, or the labor of 20 men. There will be, therefore, a material saving in labor, and the only question is, whether or not this saving will be blotted out by the cost of electric heating. This question is brought up here because heating sheet steel by high frequency induction is a new step, and mill men have no information as to current consumption, efficiencies, etc.

Tests made at the plant of one of the largest electrical manufacturing companies in this country show that a ratio of energy transfer from coil to sheet of 34 per cent may be obtained. The solid line curves were obtained with makeshift equipment and under conditions where the loss of heat from the sheet was large. The following distribution of energy may be considered to be well established: coil, 3000 watts; core, 1300 watts; sheet, 2250 watts, and this permits to calculate with fair precision the cost of induction heating. Assume that 2000 pounds of sheets are heated through a range of 100 degrees Fahr.; the specific heat of a sheet may be taken as 0.2. The heat input required then will be: 2000 x 100 x 0.2=40,000 B.t.u. As the efficiency of energy transfer between coil and sheet is 34 per cent at least, roughly 120,000 B.t.u. have to be expended which is equivalent to 35 kilowatt hours.

The energy consumption in the coils is related closely to the temperature in sheet rolling. Sheets ordinarily are heated in a sheet furnace without raising a scale which means 1500 degrees Fahr. and over, but the temperature at which the sheet is rolled is less than 1300 degrees or below the critical point.

Heat Losses Are Eliminated

The purpose of the new reversible mill is to eliminate heat losses in sheet rolling. From stand *D* the sheet goes directly to the reheating coils. The only place the material loses heat is by contact with the rolls and this loss is small because the temperature of the rolls ranges between 600 to 750 degrees Fahr. Moreover, a certain amount of heat is put into the sheet as a result of roll pressure. It is estimated, therefore, that the steel will not lose more than 75 degrees of its temperature by passing between the rolls which for five passes (the first of the six is made on the original heat) means 375 degrees. This is at the rate of 35 kilowatt hours per 100 degrees Fahr., or

131.25 kilowatt hours which is equivalent to about $1 a ton and somewhat lower for mills making their own power.

Some alloy sheets can be rolled like plain carbon sheets. Others require that the rolling be done within only a narrow range of temperatures, and that the reduction in each pass be small. The combination of these two requirements is encountered in high-chromium sheets. The reversing mill permits an extremely close control of temperature and a few extra passes mean merely that the production of the mill is somewhat reduced.

Affords Low-Tonnage Output

The reversing sheet mill is well adapted to the small mill operation with its limited output, whereas the cross country mill described in the July 26 issue of IRON TRADE REVIEW would be unsuitable because of its comparatively large output.

A new type of mill, now under construction, that eliminates five men up to 3 tons of sheets an hour and employs high-frequency heating between stages, is known as the twin-staggered mill. This unit, shown in Fig. 1 may be used either for roughing or finishing. When employed for roughing the sheet bar is heated in the usual pair furnace and placed on the table to the left of stand No. 2 upon which feed-rollers (not shown) pass it to the mill. After a pass through the rolls the piece is delivered to the feed rollers on the right hand side of the mill. While in transit to the feed rollers the sheet depresses the contact roller, shown on top of the spring, and thereby sets the feed rollers in operation which continues as long as the contact roller stays depressed. When the sheet passes completely over the contact roller, the feed rollers stop. By this time the sheet is completely within the table shown to the right of the mill, this table being equipped with a system of heating elements each consisting of a coil through which a high-frequency alternating current is flowing. In this way, during its short sojourn in the heater-lifting table, the sheet is brought back to its original temperature and compensated for the loss of heat through contact with the rolls. An electrical time-controlled switch causes the table to move down into the position indicated by the broken lines on the right hand side of the illustration, and when this happens, contact *E* engages with the socket shown beneath. This causes the feed rollers to reverse their direction and push the sheet into stand No. 1, located at the lower level and running in the opposite direction. The same process is repeated on the other side, the sheet traveling back and forth until it has reached the proper thickness.

The mills have to operate on a predetermined schedule of reductions, which facilitates the employment of electrically operated screwdowns. The screwdowns installed on the sheet mills of the American Rolling Mill Co., Ashland, Ky., have a reduction of 500 to 1, so that each revolution of the motor corresponds to a reduction of distance between rolls equal to 0.0005-inch. The only additional feature of the equipment in this case is that provision is made to return the rolls to their original distance after the end of the rolling of each individual piece. As the rolls are revolving always in the same direction, and plenty of time is available for the operation of the screwdown motors, the problems of design proved to be simple.

Matching Is Desirable

Theoretically, a sheet could be rolled from sheet bar to finish size on such a mill. Practically, however, it has been found to be more economical to roll it only down to about 14 gage, then match two to three sheets and finish the rolling to size in a second similar mill. As no doubling is done, it was found possible to redesign the usual matcher so as to increase materially its speed of operation and thus save some of the heat usually lost in matching. From the matcher, the pack travels through a reheating unit of the same type as the heater-table shown in Fig. 2 but laid out so that the sheet remains in it for as long as 20 seconds which brings the temperature of the sheet to about 1450 degrees Fahr., whereupon the pack goes into a unit similar to the one shown in the illustration but equipped with a somewhat different arrangement for receiving the sheets, and the rolling proceeds as described until the finished size is reached.

Because the sheet stays in the open air only for the shortest periods of time, and is reheated after every pass, it is possible to roll at a lower temperature than is done now, and thus materially to reduce its tendency to scale, and at the same time to maintain a more uniform temperature of the sheet than is the case today. It is also possible to make the housing more rigid, as it has to be made big enough to contain two sets of rolls.

Duties of Mill Crew

One man is required to feed sheet bars from the pair furnace into the roughing mill. The duties of the roller are, to control the operation generally, and particularly to see that the temperature of the sheet is correct. A matcher, and a crew of three are stationed at the finishing mill, two of whom perform the same operation as at the roughing mill, and the third sees that the finished sheet is properly discharged from the mill. As the production of the roughing mill is estimated to be 5 tons per hour, and of the finishing mill a little under 3 tons an hour, this amount of labor compares favorably with that used in present day practice for the same output.

The raw material, a sheet bar 16 inches wide, is delivered to the feeder table on the roughing stand by a conveyor. Twice as much output at practically no added cost can be secured in rough rolling with the wider bar.

Sparks Withington Co., Jackson, Mich., manufacturer of automotive accessories, reports net profits for seven months ending Jan. 31, $1,787,663, equivalent to $10.59 a common share.

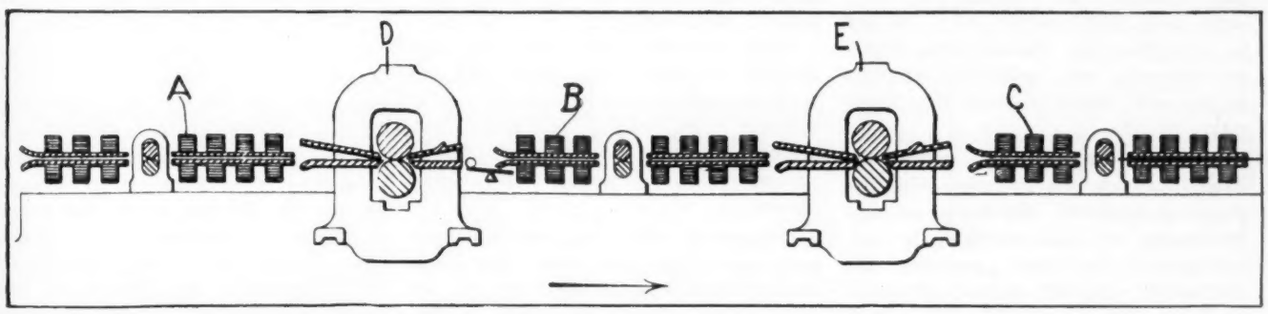


Fig. 2—Elevation of 2-high reversing sheet mill equipped with high-frequency reheating coils

A typical blast furnace and coke oven scene in the Mahoning valley. As one of the largest consumers of coal, the iron and steel industry has much at stake in the movement for production of better grades of coal

Drilling for a blast in one of the Wheeling Steel Corp.'s coal mines. This is one of the scenes from the company's motion picture film "From Mine to Market"

What Is the Coal Industry Doing To Improve Its Product?

Abundance of Coal Proves a Handicap to Scientific Development and Gives Ascendency to Economic Influences—Other Fuels Strongly Entrenched

By Feodore F. Foss

Assistant to the President, Wheeling Steel Corp.

IN THIS time of high industrial activity several industries do not enjoy prosperity. Coal mining is among the most unfortunate. As usual, the American public was not concerned with bad times when they started in the coal industry, and is not concerned at present. It never went into this matter deep enough to ascertain the causes and effects of economic and industrial changes in the coal industry since the World war.

The industry was left entirely to itself to work out its own salvation. Recently, however, discoveries of new processing of coal, particularly conversion of coal into gasoline and lubricating oils, and manufacturing of smokeless fuel aroused public attention, and we began to entertain a theory that science and technology soon will solve the intricate problems standing before the coal industry. Some writers on economic problems ventured to say that "coal appears to be at the threshold of a new era." "The scientists now bid fair to succeed where the economists have failed," they said.

Being optimists by nature we are inclined to grab such ideas and go with our enthusiastic expectations even farther. We began to hope that science applied to our wonderful natural resources would modify conditions.

Comparing what was promised several years ago and what has been accomplished we should not be so enthusiastic about immediate results of the application of science to the rehabilitation of the coal industry.

The causes of lack of prosperity in the coal industry may be classed in two groups, economical and technical. The study of coal problems shows that both causes are present, and that only a combination of economical and technological measures will help.

The interest in coal mining at present is not confined to the United States, as all principal coal producing countries are trying to solve problems analogical to ours. Nearly everywhere coal mining is far from prosperity. Beginning with 1924 and up to the present there have been held many conferences on coal in England, France and in this country. The last conference on bituminous coal took place in Pittsburgh at the end of 1928. Questions pertaining to

anthracite, lignite and oil were excluded. More than 1600 people from 20 countries attended. There were presented 1100 papers, in the ten sectional meetings.

It was shown that notwithstanding all our enormous production of different kinds of fuel, in which we occupy first place in the world, our supply is so great that the elementary demands of science applied to the fuel are defied by economics.

Our abundance in some respects is a curse to the scientific and conservation problems. The world's coal resources are estimated at about 7,000,000,000,000 tons, and half of it is in the United States. Mining conditions in the greater part of the United States coal fields are favorable. Coal is mined here cheaper than in most countries of the world, and the highest wages are paid to the coal miners. Coal is so cheap that we have not yet learned to use it properly; we waste it in mining, and we waste it when we burn it.

Take, for instance, the problem of ash and cleaning of coal. The industry is not able to erect washeries of coal to eliminate the ash and sulphur, because it wouldn't pay as a general practice. Even cheaper methods of cleaning coal by air are hardly feasible because of the same conditions. For this reason we try to take the best coal out of the veins. We transport with coal from 10 to 15 per cent and even more of detrimental ingredients, and pay for it. That is against all rules of science.

Progressive coal mining companies recently have shown efforts to start preparation of coal for the market with the idea to give to the consumer fuel of greater calorific value. In places where conditions warrant, washing and air cleaning of coal is undertaken with the idea of selling it as the "largest possible amount of heat units."

The thought arises "Why can't we transport these calorific units of coal in the form of gas?" and the answer is given that in this case the coal industry will encounter competition from the natural gas industry. This industry delivers to consumers yearly more than 1,300,000,000,000 cubic feet of natural gas of highest calorific value, and satisfies not only the domestic demand but pipes gas to Mexico and Canada.

The United States is the largest natural gas producing country, supplying 95 per cent of all natural gas used in the world. This amount of natural gas constitutes only 70 per cent of the total gas consumption in the United States, the remainder being supplied by manufactured gas. Yearly consumption of gas in the United States is more than 16,000 cubic feet per capita. In England it is 5500, in Australia 3500 and in Germany 1530 cubic feet.

By-product gas is being piped where conditions warrant. Most of such installations, however, are connected with iron and steel plants which use gas from by-product coke ovens. This distribution will grow in time. It is possible that the lines carrying by-product gas will rival in size the network of the natural gas lines.

Why don't we convert the excessive coal into oil and lubricants by the process of hydrogenation, and give relief to the coal industry by consuming more coal for such purposes? The answer is that the United States is the largest producer of natural oil in the world, gives close to 1,000,000,000 barrels of crude oil yearly to the trade, which at the present time practically cannot consume all of it.

But coal still is king of our industrial life, notwithstanding the attacks which have been made upon his throne.

However hungry he may be, he still occupies his high seat. Though inroads have been made upon his domain by oil, natural gas, waterpower and other kinds of energy, they have not endangered his position as much as the economies which have been achieved by the application of science to the utilization of coal.

During the last decade, when the demand for coal stopped to grow in proportion to the normal trend of the country's life, we have produced more electric power, more iron and steel, and moved more goods on our railroads than in any previous decade, using for that much less fuel than before.

Economy in fuel utilization is the cause for that. In 1917, for example, we used about 3½ pounds to produce one kilowatt hour in our electric stations, and now we reduced this figure to an average of 2 pounds, with best plants consuming less than 1 pound. Our railroads instead of using 176 pounds of coal per 1000 of gross ton-miles are using now an average of about 137 pounds, and best railroads use not more than 70 pounds.

The same feature we see in the iron and steel industry. In 1917 the average consumption of coking coal per gross ton of pig iron was 3524 pounds; now it is less than 3000 pounds. The best plants in the Wheeling district use less than 2600 pounds. We use more by-product coke and save by that more than ten million tons of coal.

All these savings in coal, which are roughly estimated to amount to 300,000,000 tons per year, resulted from application of science to the combustion of coal. We could enumerate separate items of these economics further, but it is enough to illustrate the fact that the development of our industries and our progress of life does not necessarily mean the increase of production of coal. There is no question, however, that in the future demand for coal will grow when the technical limits of economies of coal utilization will be reached.

In time, when petroleum production

111 Papers on Soft Coal Industry Summarized

FEODORE F. FOSS

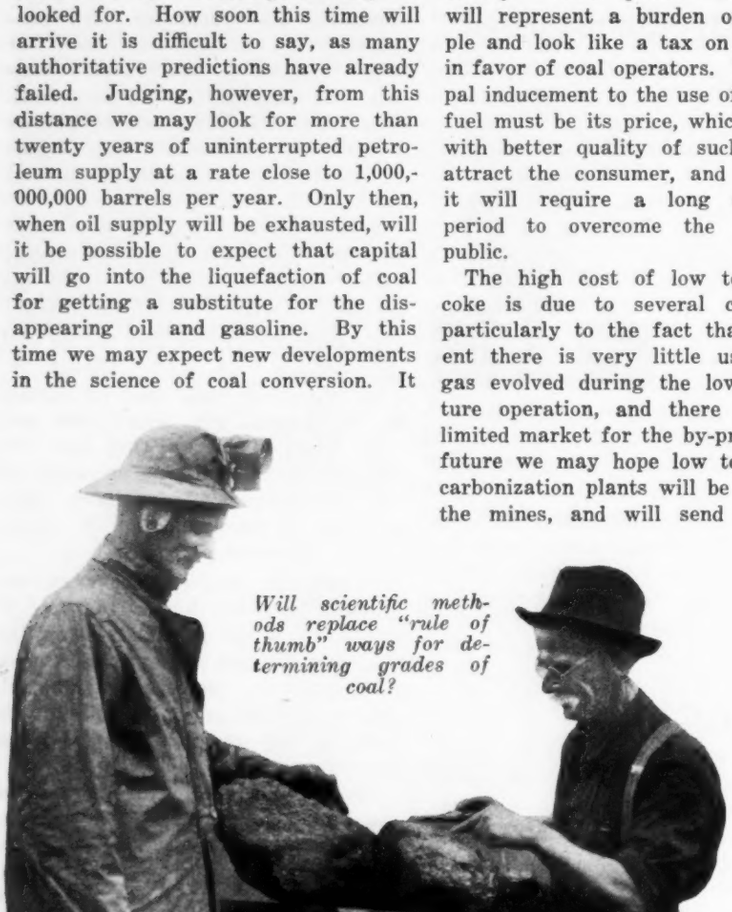
COAL mining in the bituminous field has not been a prosperous industry. Inequitable freight rates, excess capacity, labor difficulties and the glamor attending new fuels have yet showed the perplexed coal operator how to make money.

But recently rays of hope have pierced the gloom. Many have believed that the scientists, who have been studying the problems of the bituminous industry, would succeed where the economists had failed. Still another prospect of improvement lies in the conferences which have been held.

Since 1924 there have been several international conferences, at which bituminous coal held the spotlight. An international conference on bituminous coal was held in Pittsburgh in 1926 and a second late in 1928. One hundred and eleven papers were read and discussed, and in the accompanying article Doctor Foss summarizes the best thoughts developed.

Doctor Foss, is a mining and metallurgical engineer of wide reputation, was identified with many important Russian industries before coming to the United States in 1917 and becoming a citizen in 1926. For the past five years he has been with the Wheeling Steel Corp., Wheeling, W. Va., as assistant to the president.

will start to decline, which is bound to come sooner or later, the great increase in coal consumption may be looked for. How soon this time will arrive it is difficult to say, as many authoritative predictions have already failed. Judging, however, from this distance we may look for more than twenty years of uninterrupted petroleum supply at a rate close to 1,000,000,000 barrels per year. Only then, when oil supply will be exhausted, will it be possible to expect that capital will go into the liquefaction of coal for getting a substitute for the disappearing oil and gasoline. By this time we may expect new developments in the science of coal conversion. It is quite possible that coal will be used in finely divided particles, that no hydrogenation will be necessary.



Will scientific methods replace "rule of thumb" ways for determining grades of coal?

Of exceeding interest to coal producers is the low temperature carbonization process. One of the purposes of low temperature carbonization is to give to the population a smokeless fuel in places where such fuels are not provided by nature. The by-product tar from this carbonization is supposed to be used as a raw material for manufacturing of lubricant oils and different chemical products.

The idea to exclude the smoky coal from the domestic use is a noble one, but it is confronted with cold economic facts which in many cases do not allow fulfillment of the desires and hopes of the housewife. Only in very rare occasions you may see men willing to pay double price for their fuel for the sake of cleanliness of their homes and surroundings. Most of us do not care about the effect on the community of how and what kind of fuel we burn in our homes.

Smokeless fuel could be introduced by special city ordinances or by state legislation, but that does not appeal to our understanding of personal liberty. Under present conditions it will represent a burden on the people and look like a tax on cleanliness in favor of coal operators. The principal inducement to the use of smokeless fuel must be its price, which, together with better quality of such fuel will attract the consumer, and even then it will require a long educational period to overcome the inertia of public.

The high cost of low temperature coke is due to several causes and particularly to the fact that at present there is very little use for the gas evolved during the low temperature operation, and there is only a limited market for the by-products. In future we may hope low temperature carbonization plants will be located at the mines, and will send their gas through the pipes to the nearby consuming industrial centers, deliver smokeless fuel for domestic and transportation purposes, and give the by-products to the concerns manufacturing lubricants and different chemical products. Low temperature carbonization plants possibly will be a prerequisite to every coal mine in the future, but at present erection of such plants would not give any returns at all.

Railroads use about 26 per cent of the coal produced in the country, electric utilities 7 per cent, homes and city buildings about 20 per cent. What enormous amount of by-product gas and tar will be received when all the coal necessary for these purposes will be processed through the low temperature carbonization; the prices for these by-products would be so low that smokeless fuel from such processing will be expensive. The economies of low temperature carbonization, based on the value of gas, tar and tar products, will fail.

The confirmation of such conclusion can be had in the fact that at present, when tar and tar products in this country are received mainly from the high temperature carbonization of coke for metallurgical purposes, we simply burn as a fuel more than 250,000,000 gallons of tar under the boilers and in the furnaces of steel plants. Only small quantities, not exceeding 10 per cent of tar produced, are used for further distillation.

The fertilizer industry is closely connected with coal, coal being a source of large part of nitrogen-bearing fertilizer. The United States farmer pays nearly $100,000,000 for the nitrogen he puts into the soil. This nitrogen comes mostly in form of ammonia-sulphate delivered to the market by the iron and steel plants. With the growth of iron industry, better to say with the growth of by-product coking, the amount of ammonia-sulphate delivered to the farmer will be increased. More than 7,000,000 tons of beehive coke still is produced annually in this country, and when this tonnage will be converted by the way of by-product coke ovens the amount of ammonia-sulphate delivered to the market will be increased on about 14 per cent.

Whatever is said about the fixation of air nitrogen and notwithstanding the intention to spend millions on Muscle Shoals "to save the farmer," up to the present time the largest amount of fertilizing nitrogen is delivered in this country by the steel industry, which for a long time will be able to keep its dominant position in this line. The fertilizing industry, and particularly delivery of nitrogen, will naturally grow, but whatever processes will be used it will very little affect the demand for coal.

As intimated previously many different things have been expected from scientific gatherings held lately, but science and technology alone have no power at the present time to stabilize the coal industry. There are other elements, which affect this industry and affect it very seriously. These factors are located in the economic side of the industry and in all complexes of our life. Everybody knows, that coal mines of the United States are able to produce much more coal than there is demand for, that the demand for coal during the last decade has shrunk to about 60 per cent of the capacity.

Most of the coal mines do not give steady employment to miners because of the seasonal demand for coal, and coal is distributed in this country in the most irrational way. The full-time capacity of coal mines of the United States is close to 960,000,000 tons. Assuming only

280 working days in the year we will find this capacity about 875,000,000 tons. If we take into consideration only capacity of mines which are now open, deducting more than 2000 mines which have been shut down since 1926, we will find that the full-time capacity will be more than 800,000,000 tons. It shows that the industry has an excess capacity of more than 60 per cent of the demand. Here lays the explanation of the main ailments affecting the industry, and it is the opinion of all students of coal mining industry, that economic measures will bring stabilization to this industry quicker and more completely than any technical inventions pertaining to new uses of coal.

Necessitates Law Revision

In particular conditions of this country, where by the Sherman and Clayton acts the industry is not allowed to combine for distribution of its products, the problem of stabilization of coal mining becomes not only an economical but also a political issue. Therefore, we have to look forward to the time when the law will be modified in such sense that will give to the coal operator a *free hand* to regulate its production and distribution. In the meantime we will witness the process of merging among coal mining companies with ultimate elimination of weak elements. Only concerns strongly financed and well equipped will be able to weather out the prolonged storm of economic, social, and political crosscurrents affecting the coal mining industry.

Besides this cardinal question, there are several other influences of lesser importance, however, which work in the direction of the evolution of coal mining industry. Because of the instability of working conditions in coal mining, mostly dependent on the seasonal demand, operators are extremely eager to go into mechanization of work on broad scale: Mechanical loading and underground transportation is coming into use more and more; introduction of special scrapers cheapens the coal mining.

This again, puts another aspect on the coal mining problems and on the kind and quality of coal which the industry will deliver. Mines are going to give cheaper fuel, but with more slack, which will not be so easy to transport and burn under ordinary conditions. This evidently will lead to utilization of slack coal close to the mines, and influence the development of local carbonization plants as it was mentioned above. In this way the evolution of fuel problem in the new scientific direction will be started.

It is quite evident that a combination of technical and economical improvements ultimately will bring the coal industry to the level of prosperity, but we will come to that rather slowly; there is no other way, as the nature of the things involved is of great volume and conservative character. Large problems in this world are worked out only by evolution, and technological science will put new things in life only at the time when economic conditions will allow it, and life will be able to afford it. There are always periods of preparation; we are now in one of such periods, and we should not expect too much from it.

In dealing with such problems as coal—its mining, utilization, and future developments—we must prepare ourselves to a different way of thinking than that which we apply to the problems of everyday life. When we talk about coal, we must put before ourselves the figures of great magnitude of the order quoted above, billions of tons in reserves and hundreds of millions in yearly production, and in looking on conversion of these tremendous amounts of energy into other forms for human use in the future, we have to think not in terms of years, but rather in terms of decades.

Humanity with all its latest achievements is still in its infancy. All that is in our possession at the present time came to us gradually, as result of labors of our forefathers. We are here to continue this work and in course of our labors we should visualize the wonderful life which is developing on the earth, and which will flourish when science in proper economic conditions will be applied in full volume to the resources, with which nature in such abundance endowed our country.

Studies Quality of Pig Iron and Castings

(*Continued from Page* 986)

total carbon plus one-third silicon. The trend indicated a decrease of tensile strength with increasing total carbon plus one-third silicon. Then the tensile strength of each heat was compared to the average tensile strength. Considering each heat and averaging the heats made from each lot of pig iron, the data in Table V was obtained.

The rigidity of cast iron is indicated by the deflection of the bar during the transverse test on the 1¼-inch round arbitration test bar. Comparison of all the heats has been made on the basis of deflection at 1000 pounds load, indicating decreasing rigidity with increasing total carbon plus one-third silicon. The degree of rigidity above or below average determined for each heat and averaged for each group of cast iron made from one lot of pig iron is shown in Table VI.

Summary and Conclusions

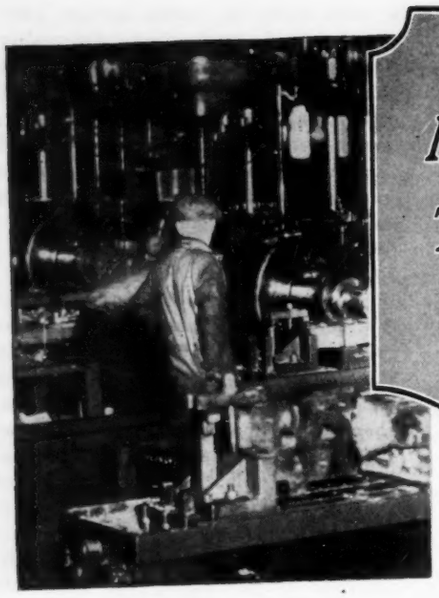
The investigation strengthens belief that physical character of pig iron is greatly influenced by variations in blast furnace operation and that two pig irons may have almost identical chemical composition but still be as far apart as the poles in physical properties. Also it is demonstrated that the physical characteristics of pig irons persist during remelting in the cupola and greatly influence the physical properties of the cast iron made therefrom.

Every foundryman is interested in obtaining pig iron which always behaves the same. What he wants is uniformity of raw material. To get that it will be necessary to start back at the blast furnace and eliminate some of the tremendous variations we know exist there. When we can maintain constant some of the biggest variables in blast furnace practice and make further study of pig irons we will probably learn enough about different kinds of pig iron of like chemical analysis to be able to classify them in something like the manner in which steels of like analysis have been sub-divided into fine-grained and coarse-grained, fine-grained normal, coarse-grained normal, fine-grained abnormal, etc. Instead of calling pig iron "good" and "bad" we will refer to it for example as No. 2X soft, No. 2X hard, No. 2X non-chilling, No. 2X l.v.s. (for low volume shrinkage) or by some system of classification which will indicate the character which we can expect to be transposed from the pig iron to the cast iron made from it.

In closing, some of the blast furnace data again is presented in order to leave with the reader a clear picture of the variable character of blast furnace operation:

	Max.	Min.
1. Coke per ton of iron produced	2,440	1,765
2. Pounds of air used per pound of carbon in coke	6.3	4.27
3. Pounds of air used per pound of iron produced	5.45	3.29
4. Pounds iron produced per hour per square foot area at maximum diameter	179	95.8
5. Pounds of water in blast per ton of iron produced	121.6	22

Ninety per cent or more of the silver produced in Austria for most of the period since 1800 has come from the state-owned mines at Pribram.



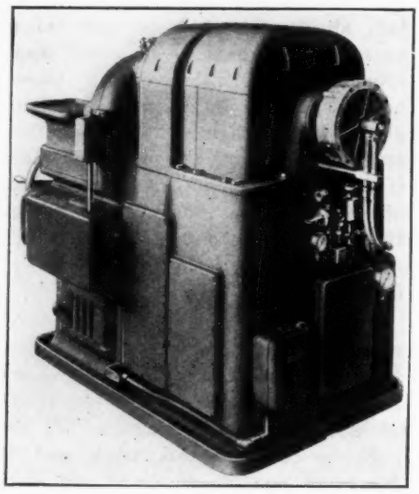
New Machine Tools and Shop Equipment

"Without tools man is nothing, with tools he is all."—Carlyle

Machine Finishes Teeth of Rough Cut Gears

No. 78

Pratt & Whitney Co., 111 Broadway, New York, has developed a gear shaver for finishing the teeth of rough cut gears to true involutes. A 2-horsepower motor located inside the bed in a private compartment drives the entire machine. The spindle mechanism is in two parts, a spindle within a sleeve. On the front end of the spindle sleeve is mounted the master involute cam which produces the movement of the tool slide. On the spindle itself is mounted the gear to be shaved. Consequently the gear is always oscillating in time with the cam and the tool slide, but it is indexed one tooth at every complete oscillation.



No. 78—Gear shaving machine

A compressed air locking mechanism on the rear end of the spindle produces a slight movement of the arbor sufficient to hold the gear in place. The design of the arbor and locking mechanism is dependent upon the shape of the gear being shaved, and is special for each type. Indexing is accomplished at the correct instant by the synchronized swinging of the arm and oscillation of the plate. On the return stroke, however, the cam arm swings into the clear. Moving back and forth under the gear is the slide which carries two shaving tools.

Presses now Built with Two-Pawl Clutches

No. 79

American Can Co., 120 Broadway, New York, equipment division, has incorporated a double-pawl clutch in the design of its line of presses, to be used instead of the single-

Iron Trade Review's Calendar of New Equipment

Item	Comment	Builder	No.	Date Described	Page
Grinders	Small high-speed units; bench or floor types	Kling Bros. Engineering Works	58	March 14	719
Crane	Improved lubrication; numerous safety features	Whiting Corp.	59	March 14	719
Tractor crane	Increased flexibility and greater capacity	Otis Engine Corp.	60	March 14	720
Nut tightener	Auxiliary clutch said to prevent ratcheting and jerking	Independent Pneumatic Tool Co.	61	March 14	720
Hoist	Mounted on 5-ton truck; gasoline motor drive	American Hoist & Derrick Co.	62	March 14	720
Gear cutter	Hypoid head handles gears 60 inches in pitch diameter	Gleason Works	63	March 14	720
Milling machine	Provided with combination power and manual feeds	Kent-Owens Machine Co.	64	March 14	721
Feed pusher	For high speed handling of stock to screw machines	Eastern Machine Screw Corp.	65	March 21	793
Welding torch	Simultaneous operation of valves admitting gas and air	St. Paul Welding & Mfg. Co.	66	March 21	793
Air heater	For recovery of waste heat in stack gases to preheat air	Shaw-Perkins Co.	67	March 21	794
Grinder	Portable pneumatic type with multivane motor	Ingersoll-Rand Co.	68	March 28	858
Electrode holder	For metallic arc welding; copper jaws prevent sticking	Lincoln Electric Co.	69	March 28	859
Die head	Floats on shank, permitting self-centering on stock	Landis Machine Co.	70	March 28	859
Grinder	Air-operated, light in weight; close speed control	Buckeye Portable Tool Co.	71	March 28	859
Grinder	Pneumatic; for grinding metals of high tensile strength	Rotor Air Tool Co.	72	March 28	859
Grinding wheel	Four abrasive segments mounted in 11-inch wheel	Blanchard Machine Co.	73	April 4	928
Die punching press	Built with six punches and dies, individually operated	Zeh & Hahnemann Co.	74	April 4	928
Wire reel	For use with cable or wire rope stranding machines	Pittsburgh Producers Supply Co.	75	April 4	928
Switches	New line of master and limit switches, cam operated	General Electric Co.	76	April 4	928
Pipe machine	Duplex 12-inch type; designed for oil field work	Bignall & Keeler Machine Works	77	April 4	929
Gear shaver	For finishing teeth of rough cut gears to true involutes	Pratt & Whitney Co.	78	April 11	1000
Double-pawl clutch	Incorporated in design of new line of presses	American Can Co.	79	April 11	1000
Air drill	Rotor governor controls speed and air consumption	Rotor Air Tool Co.	80	April 11	1001
Polishing machine	Also buffing; double spindles entirely independent	Excelsior Tool & Machine Co.	81	April 11	1001
Buckets	Open and closed types for materials handling	Reichmann-Becker Polyp Co.	82	April 11	1001
Coal loader	Electric operation; continuous loading action	Covington Machine Co.	83	April 11	1001
Pump	Hydraulic; working pressures up to 6500 pounds	John Robertson Co.	84	April 11	1001

pawl unit. Working in the opposite direction, is a locking-pawl that eliminates rebounding of the press slide at the bottom of the stroke. This latter feature prevents the crankshaft from overtaking the flywheel.

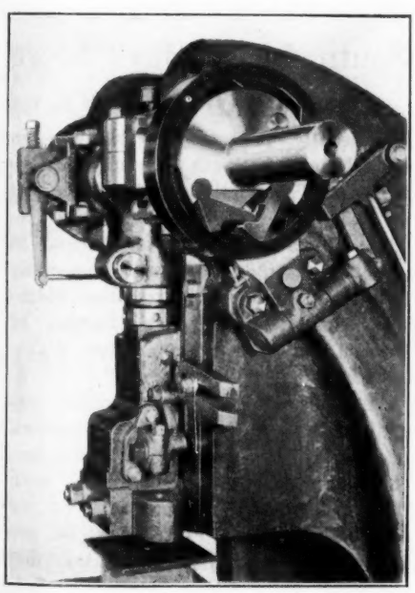
The double-pawl is particularly recommended for deep drawing work. The flywheel is locked securely to the clutch collar until the stroke is complete. A cam-operated brake also is designed to prevent rebound and backlash.

The locking-pawl, like other parts of the clutch, is made of tool steel, hardened and ground and has a long substantial bearing to reduce wear. Chrome-nickel steel from which the crankshaft is constructed, is heat-treated and ground. Six points of engagement are provided on a hardened steel ring which is pressed and keyed into the flywheel. No springs are used and but two parts constitute the moving section of the clutch. The brake is so designed that the crankshaft always stops in a position where both pawls will drop into locking position by gravity.

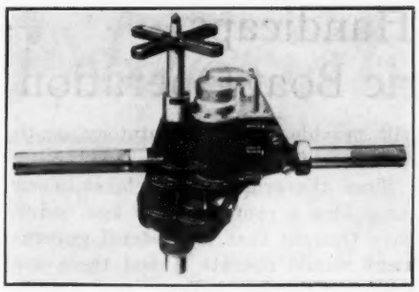
Air Drill Suitable for Heavy Duty Drilling

No. 80

Rotor Air Tool Co., 5905 Carnegie avenue, Cleveland, announces a new type air drill suitable for heavy duty drilling, reaming and nut setting. Motor racing at idle speeds automatically is prevented and air consumption is reduced to a minimum by the new rotor governor. Three speeds namely 220, 280 and 350 revolutions per minute are available with the rotor motor. The power



No. 79—Double pawl arrangement on clutch of press



No. 80—Heavy duty air drill

is transmitted through compound gears. Lubrication is provided by an oil reservoir in the body of the unit.

Polishing, Buffing Unit Has Double Spindles

No. 81

Excelsior Tool & Machine Co., Thirtieth to Thirty-second street, Ridge to Jefferson avenue, East St. Louis, Ill., is marketing a polishing and buffing machine equipped with double spindles which are entirely independent of each other thereby permitting operation at different speeds. It is not necessary to stop the motor to change the wheels. Tight fitting wheels can be removed readily. The inside lever is used to raise the head which tightens the belt to the proper tension so that any pressure can be applied to the wheels without slipping.

Releasing the outside handle lowers the head against a friction block under the pulley, stopping the spindle instantaneously. Oversize ball bearings are mounted in dustproof housing. The motor is also ball bearing, dustproof and easily removed from the housing. The screened dust plate in front and rear of the housing allows free air circulation. Wheel capacity is 16-inch diameter by 4-inch face or less and 1½-inch spindle. Height from floor to center of spindle is 39 inches. The entire machine weighs 1400 pounds.

Foreign Concern Markets Handling Buckets

No. 82

Reichmann-Becker Polyp Co., Duisburg, Germany, is manufacturing and marketing a multiple flexible-blade bucket in both an open and closed type. Incorporated in the design, are long blades which operate independent of one another and adjust themselves to the material to be handled.

The open type with eight blades is used for handling steel scrap, pig iron and other sparry material, while the closed bucket is designed for handling ore, coal, coke, gravel, sand, stone, etc. One of the principal advantages is that it handles full loads with each lift. The buckets are built from the smallest size to a capacity of 20 cubic yards. This equipment is used widely in Europe.

Announces Electric Coal Loading Machine

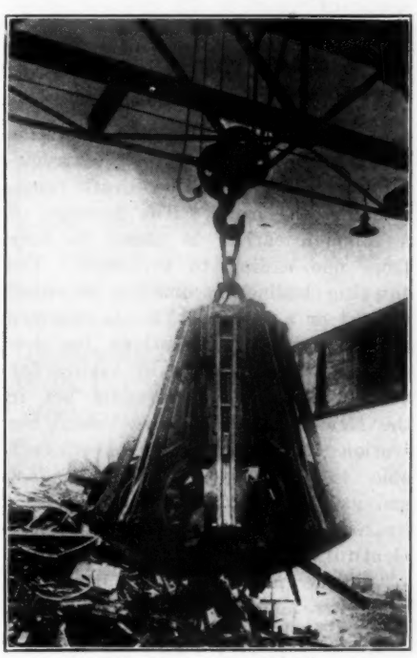
No. 83

Covington Machine Co., Covington, Ky., has developed a coal loading machine equipped with a shovel end for digging, conveyor and reciprocating head. It is furnished to operate on crawler treads, mine track, or a combination of the two. Controls are simple to operate. The shovel end of the machine can be adjusted to suit the mine floor and the loading action is continuous. Three electric motors provide the power for the various operations.

Hydraulic Pump Designed for Continuous Work

No. 84

John Robertson Co., 121-137 Water street, Brooklyn, N. Y., is marketing a hydraulic pump designed for continuous service and working pressures up to 6500 pounds per square inch. Incorporated in its construction are bronze-lined eccentric bearings and knuckle joints, and babbitt-lined main bearings which are lubricated automatically from a 2½-gallon oil reservoir. Equipment also includes a hydraulic safety relief valve.



No. 82—Open-type eight-blade bucket handling scrap

Barge Canal Draft Handicaps Diesel Electric Boat Operation

BECAUSE the New York State barge canal does not have its full statutory depth of 12 feet, two modern diesel electric vessels TWIN PORTS and TWIN CITIES are unable to carry a profitable load and will probably be discontinued, according to T. H. Hoopes, secretary of the Detroit & New York Transit Co., who has been operating the boats.

The all-water service from the lakes to the sea first was started by the Minnesota-Atlantic Transit Co. in 1923 on a run between New York and Duluth, Minn. The route was shortened in 1925 to a run between Detroit and New York. The Minnesota-Atlantic Transit Co. operated this line until 1927 when the Detroit & New York Transit Co. was formed as a subsidiary of the Terminal and Transportation Corp., which is also the parent organization of the Minnesota-Atlantic Transit Corp.

It was thought that the Great Lakes and canal route to the seas would be profitable because of the economical operation of the 2600-ton diesel electric vessels.

Both east and west shippers appreciated the savings of the all water route connecting the Atlantic seaboard with the Great Lakes territory. The business increased to the point where it was about to become profitable only to reach a capacity limit because of the shallowness of the New York State barge canal, the statutory depth of which is 12 feet but which is only about 11 feet in many places.

"We are reluctant to discontinue this service," said Mr. Hoopes, "but we have absorbed about all the loss that we can stand on the operation of our motorships under the extremely disappointing shallow draft conditions of the canal. The tonnage of a common carrier is bound to vary from one sailing to the next. The shipping business seems to be either a feast or a famine. This is expected and in ordinary operations the low spots can be overcome by taking full advantage of the high spots but in the New York State barge canal operation where we have never been able to go deeper than 10¾ feet and usually not more than 10½ feet, we are severely handicapped when a plentiful volume of freight is offered.

"At the present time, our motorships are laid up in New York harbor. Whether we will operate this year is undecided. We are hopeful that some day the division of canals and waterways of New York State will provide the full statutory depth of 12 feet."

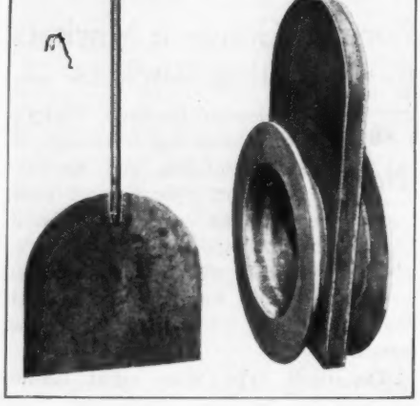
Since the origin of the lakes-to-sea canal idea a century or so ago, many have thought that the federal government should operate it and there are still some who believe the United States should take over the canal, deepen it and make other improvements as the first step toward a practical and economical lake to sea waterway.

The diesel electric vessels TWIN PORTS and TWIN CITIES were designed by Henry Penton and were built in the shipyards of the Great Lakes Engineering Works at Detroit, in 1923. At the time the service was started it was acclaimed by both eastern and western traffic men as it provided a direct route between the coast and inland ports at a saving of approximately 25 per cent over all rail routes. Time of delivery is definitely established by schedule.

Designs Blast Valve for Gas Plants

A blast valve of arc welded steel construction has been designed by the Gas Machinery Co., Cleveland, to be used on blast lines for blue water gas and carbonated gas plants. The valve housing consists of a section of 16-inch steel pipe which is inserted through the gas gate case and welded in place. Connection flanges are cut from steel plate and arc welded to the ends of the pipe section.

The gas gate is then cut through the pipe section with a gas torch. A steel plate cut to size and electric arc welded to its threaded regulating shaft forms the gate. This assembled gate then is inserted through the open bottom of the housing and the valve arc welded pressure tight. Welding equipment used was manufactured by the Lincoln Electric Co., Cleveland.



Valve and gate with regulating shaft

Wages Fall in Pig Iron Industry During 1927

Data collected by the department of commerce show that 116 establishments producing pig iron and ferroalloys in the United States in 1927 employed on an average for the year 27,958 persons. This figure is 1230 less than that of the 122 plants operating in 1925.

Wages, with the exception of those paid salaried employes, amounted to $44,258,499, against an aggregate pay roll of $45,312,168 in 1925. The census further discloses that the output of pig iron and ferroalloys in 1927 amounted to 36,498,566 gross tons valued at $707,886,917, a decrease of 0.5 per cent and 7.1 per cent, respectively, compared with the production in 1925 the last preceding census year.

Other comparisons follow:

1925	1927	1925
No. of establishments	116	122
Wage earners (av. for year)*	27,958	29,188
Wages	$44,258,499	$45,312,168
Cost of materials, furnace supplies, fuel and purchased power, total	$579,555,036	$617,416,880
Materials and supplies	$381,622,775	
Fuel and power	$197,932,261	
Products, total value	$708,904,238	$765,286,229
Blast furnace products	$706,447,979	$763,425,097
Other products, value and receipts for custom work	$2,456,259	$1,861,132
Value added by manufacture	$129,349,202	$147,869,349
Horsepower	1,546,993	1,380,394

*Not including salaried employes.

South Africa Buys More Mining Machinery

Generally prosperous conditions in the Union of South Africa and the increasing production of diamonds and of gold and other metals have resulted in a steady upward trend in imports of industrial and especially mining machinery, states the industrial machinery division, bureau of foreign and domestic commerce, Washington.

In 1927 Great Britain, which naturally predominates in this market, provided 63 per cent of all the machinery imports of this country, with the United States second with 24 per cent and Germany third with 6 per cent. Both the United States and Germany have been increasing their percentages while that of Great Britain has been declining.

Editorials

Reserve Board Between Two Fires

PROBABLY it would be difficult to discover in the history of American finance a period of more bitter controversy and confusion of counsel than now exists with respect to the federal reserve board's policy in the present credit situation. Some assail the board for permitting its resources to be utilized in stock market speculation. Others assail the board for its alleged attempt to create artificially high money rates and interfere with natural economic forces.

Consequently the board is between two fires. Probably the greatest weight of orthodox opinion is that speculation has gone too far, that the stock market has absorbed more than its share of banking credit, and that the situation should be brought in hand. The board has attempted to do this by means of warnings and by seeking co-operation of member banks. The latter are tightening the reins upon collateral loans. If these means fail, the alternative is again to advance rediscount rates. The board shrinks from this step, fearing harmful effect upon business.

The advance of call money to such high levels as recently prevailing has led to some comparisons with the crisis of 1920. But there are fundamental differences. Then the federal reserve system's cash ratio was almost down to the legal minimum of 40 per cent. It is now above 70 per cent. Reserve banks are supplying only about $1,000,000,000 in rediscount.

Apparently what the federal reserve board is trying to do is to steer a middle course. It believes that too much credit is being used in security speculation. It is trying to correct this and at the same time preserve as cheap rates as possible for business. Meanwhile, fundamental credit conditions are sound, and there is no real danger that business prosperity will be smothered by the lack of sufficient banking credit.

Comeback in Car Buying Unusual

THAT additional freight car orders within the past week have brought the year's total up to more than 44,000 cars is not in itself especially notable, in view of performances in the corresponding period of other years. Nor is it an exceptional omen that this total makes earlier predictions of a 75,000-car year possible. Both figures have been exceeded.

But it is particularly noteworthy that within the short span of little more than three months domestic freight car buying has practically equalled that for all of a preceding year. No record perhaps is more unique among the major consuming classifications of iron and steel, and, no more rapid rate of recovery from the doldrums of a preceding 12-month period is believed recorded in the carbuilding industry.

Particularly satisfying from the steel producer's standpoint is that never before, due to material and increasing size specifications, has a corresponding number of freight cars ever taken such a large quantity of steel.

Preparation Is Key to Scrap Value

IMPROPERLY prepared scrap often results in prolonging charging periods and in increasing the cost of steelmaking at open-hearth plants. When a heat is to be worked from all heavy melting home scrap the furnace can be charged in 40 to 60 minutes. But with miscellaneous scrap the charging time frequently ranges from two and one-half to three hours. Moreover, with this grade it is necessary to charge on three different occasions, melting down between charges. Such practice results in a decrease in the output of about 15 per cent and a corresponding increase in the coal equivalent.

Light sheet scrap presents another illustration. The average net weight of a hopper carload of bundle sheets is 21 tons; the same car will hold 48 tons of compressed sheets. Not only are the car handling charges reduced when scrap is prepared to have greater weight per cubic foot but the time required to charge the furnace also is increased materially.

Anything that tends to delay the charging machine operator in getting the stock into the furnace for melting down threatens steel production costs. Compactness of scrap is an important factor and the steelmaker whose objective is to produce ingots at the lowest possible cost should look at his stockyard when the charging board shows prolonged "spells" between heats.

Basic Materials Generally Favorable

BASIC materials in the iron and steel markets generally are strong. The recent bulge in demand for beehive coke has lifted, however, probably indicating a less recession from the peak in ironmaking operations than advent of

milder weather and decreased demand for heating fuel. Contract shipments of large operators show little decrease.

Beehive was a source of reserve power during first quarter, supplementing by-product coke when blast furnace needs exceeded supply. Increase in beehive coke tonnage compared with a year ago reflects the heavy production of pig iron in the first quarter. Beehive coke has lost its former position in the iron and steel industry, due to the inroads of by-product fuel. The upturn in demand and appreciation of 25 to 35 cents a ton in beehive material during first quarter, therefore, is noteworthy. This gain has shrunk 20 cents in the spot market, and admittedly the bloom is off the peach.

Old material has been in a strong market. Scrap-production has been heavy, but record-breaking consumption has offset this. Scrap purchases have increased, following a quiet period, and disclose a scarcity of steelmaking grades.

In semifinished steel a still stronger situation is seen. Actual shortages are present in open-hearth rerolling billets, slabs and sheet bars. Heavy backlogs of merchant bars, sheets and strip and reluctance of steel producers to sell semi-finished material indicate tightness in this situation will continue another month. It does not seem possible that the record steel production of February and March can be exceeded during April, if only because of mechanical reasons, but a precipitous decline appears equally unlikely.

Merger Styles Change; Number Gains

SEVERAL points are of interest to the iron and steel industry in a report prepared for the committee on recent economic changes, appointed last year as part of the President's permanent conference on unemployment. A survey disclosed the fact that iron and steel and machinery manufacturers have accounted for about one-fifth of all mergers and acquisitions in mining and manufacturing since 1919, a prolific merger period in the country's history. One of the conclusions drawn from the investigation is that consolidations are most numerous in periods of prosperity, decline during depression.

This statement, of course, refers to mergers in general, as it does not appear applicable to the iron and steel industry. The great majority of mergers in this industry for the period reviewed in the report occurred in the last few years, when profits were at the vanishing point, and when the companies were struggling against ruinous competition. The year 1928 was one of comparative prosperity, and fairly prosperous conditions now prevail. If the conclusion drawn from the survey is true, as to the iron and steel industry, we may expect more mergers to follow this period; whereas, the movement has simmered down.

The report points out that mass production is forcing mass distribution, a factor leading to many mergers in various industries. Styles change in mergers, as in other things; as, for instance, oil mergers were the "rage" in 1920, but now are "out of the picture," whereas there now is a rush of mergers in chain stores, banks, hotels, motion picture theaters, and above all in the field of public utilities. Regardless of the ebb and flow in individual industries, the fact remains that the number of mergers is increasing steadily, and that better, more economical distribution, is the chief objective, rather than improvement or economies in production.

Too Swift for Prophets

TIME was when prophecy was measureably safe, at least for a few years ahead, in business. The stability of things was relatively assured and a decade or a century made little difference. Things would be much the same.

That day has passed. Two or three decades now overturn the picture and bring conditions so different that no prophet could have dreamed it.

Some statistically-minded American has computed that 30,000,000 people in this country now earn their living from five major industries which were non-existent, or nearly so, 25 years ago. Whether there are that many or half as many matters little. That some millions have occupations that were unknown a quarter of a century ago shows how rapidly the milestones are being passed. The industries involved are automotive, motion picture, radio, chemical and electric.

Perhaps there is some argument as to the status of the latter two, yet they have grown far more in that period than in the rest of the world's history. Of the automotive and radio there is no question, and motion pictures were in an infantile stage at 1900.

All five of these industries involve iron and steel and other metals in a large degree, automobile building having taken the lead in steel use.

The prophet of the steel industry about 1900 who could have foreseen the new fields of demand would have found little honor in his own industry. Yet the quarter century was to see a new leader in consumption of steel arise from an infant industry. It was to see motion picture equipment grow to large proportions, radio come out from nothingness, and a tremendous development of steel needs for chemical and electrical purposes. Development of the oil industry, a by-product of automotive growth, was also to call on the steel industry for a mountain of steel.

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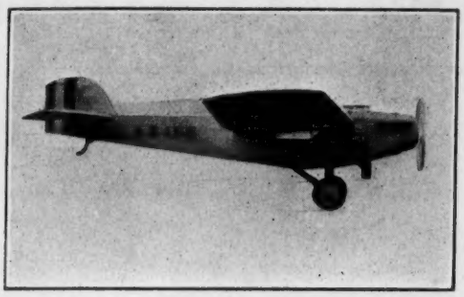

Increasing Use of Metal in Aircraft Construction Indicated by Detroit Show. Page 990.

AN ARTICLE of outstanding importance in the iron and steel industry is that beginning on page 981, reporting results of an investigation of the quality of castings in relation to blast furnace practice, made by General Motors Corp. A. L. Boegehold, its metallurgist, has given a description of the tests, and conclusion, in the paper prepared for the annual meeting of the American Foundrymen's association in Chicago this week. Foundrymen have long wanted to study some of their problems by following materials and practices back to the blast furnace. Here it has been done on a comprehensive scale.

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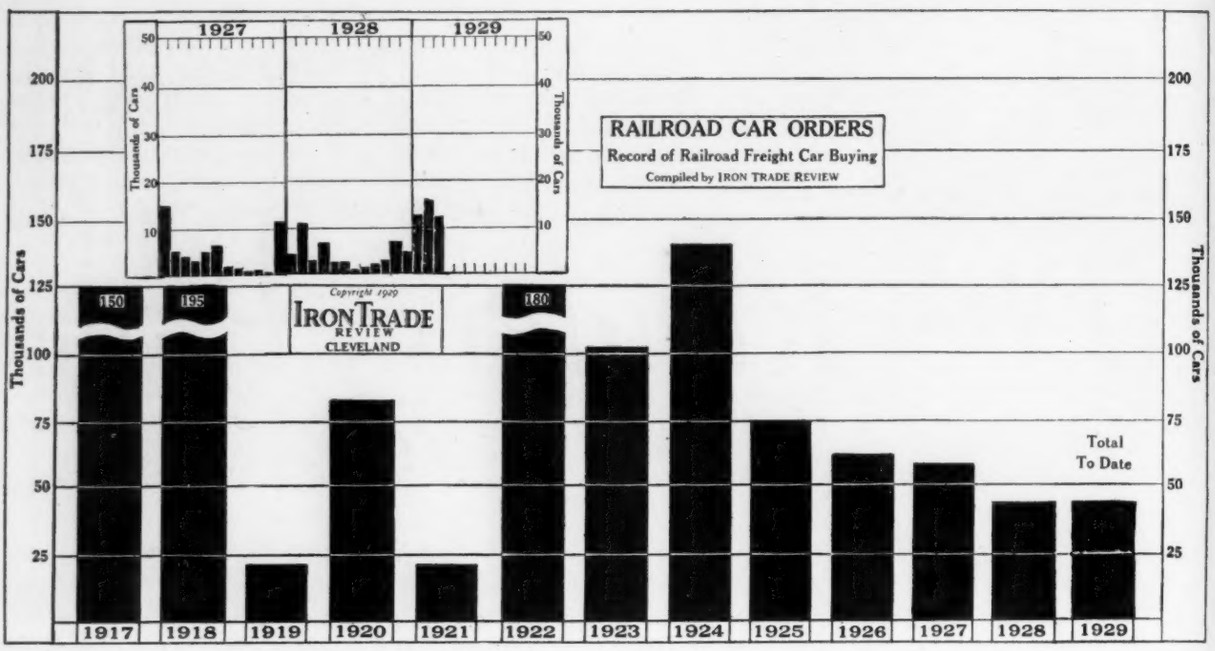
The Business Trend



First Quarter Makes Records

By JOHN W. HILL, Financial Editor

WITH new high records established for March and for the first quarter in the iron and steel industry, there naturally is much speculation as to the prospect for the second quarter and the last half. Some observers expect a downturn is due, which will bear comparison with that of the late spring and summer of 1924. Others look for a seasonal let-down which will not be unduly severe.

ON THE unfavorable side of the picture are the uncertain credit situation, the decline in building construction, and the high production that has taken place in some lines. This state of affairs may lead to a slackening up, but it would be easy to over-emphasize the adverse effect.

CURRENTLY there is much hue and cry over the position of credit. The fact remains that the federal reserve system is in a healthy condition. Pressure is being brought by the reserve board to reduce the volume of funds flowing into security speculation. This is being done for the express purpose of protecting banking credit for business. All in all, there is no danger of such a dearth of funds as to cause business embarrassment from that cause.

GENERAL sentiment might be weakened by a bear stock market, but while industrial earnings remain high there seems little prospect of a prolonged decline in sound securities. Building construction has declined but this has been mostly confined to speculative building of housing in eastern metropolitan centers.

PRODUCTION of iron and steel and automobiles has been high. There is little, if any, speculative buying of iron and steel. Motor car producers have produced an unprecedented number of cars since the first of the year and dealers stocks, totaling 600,000 cars, are some 250,000 cars higher than one year ago. Yet the early appearence of warm weather may serve to reduce these stocks by stimulating spring demand.

ON THE whole, the situation appears to be approaching the spring peak, but nothing has happened yet to foreshadow a severe drop in general industrial activities to a subnormal level. The steel industry has been given impetus this spring by railroad purchases. As shown by the graph, orders for freight cars in March totaled 12,023, making an aggregate of 41,163 cars in the first quarter of the year against 44,763 for all of 1928.

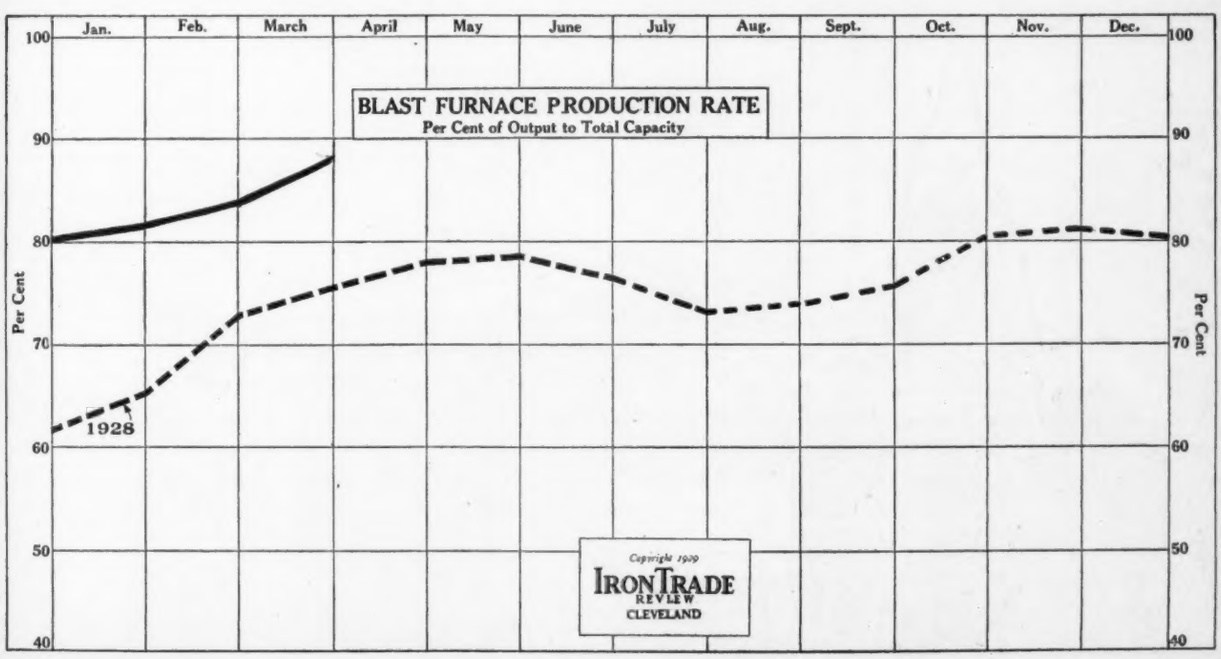
The Business Trend

Pig Iron Situation

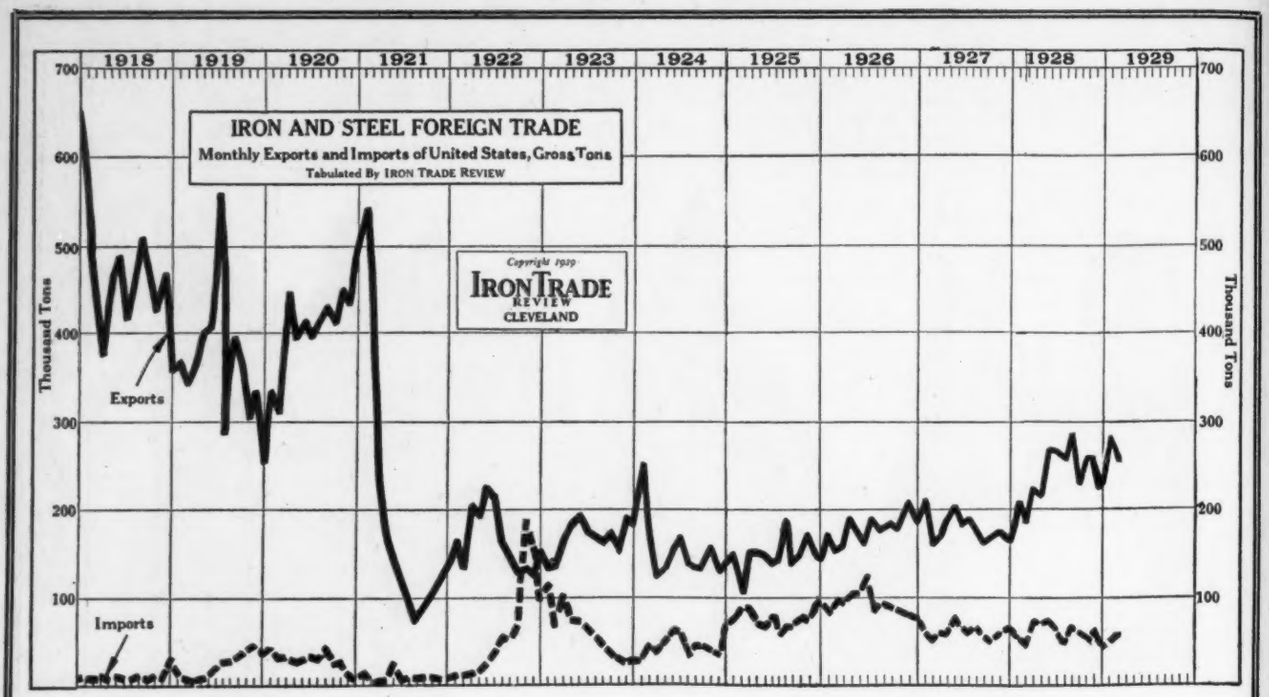
NEW high records in the production of pig iron were established for both March and for the first quarter. The daily average rate of output in March was 119,575 tons, compared with 114,942 tons in February and 103,199 tons in March, 1928. Total output for the first three months of the year was 10,358,226 tons, compared with 8,953,358 tons in the like period of 1928. In the first quarter of 1926 output was 9,701,810 tons. Pig iron prices in most districts are now at the highest point in a year.

Blast Furnace Operating Rate

PRODUCTION of pig iron in March represented 88 per cent of the estimated capacity of the country's blast furnaces. This compared with 84.5 per cent in February and 76.1 per cent in March, 1928. The estimate is based on computed capacity by the American Iron and Steel institute of 49,605,-720 tons as of Dec. 31, 1927. At the end of the month 213 furnaces were in operation, compared with 208 one month ago. This larger number of furnaces in blast at the beginning of April indicates larger output.



The Business Trend

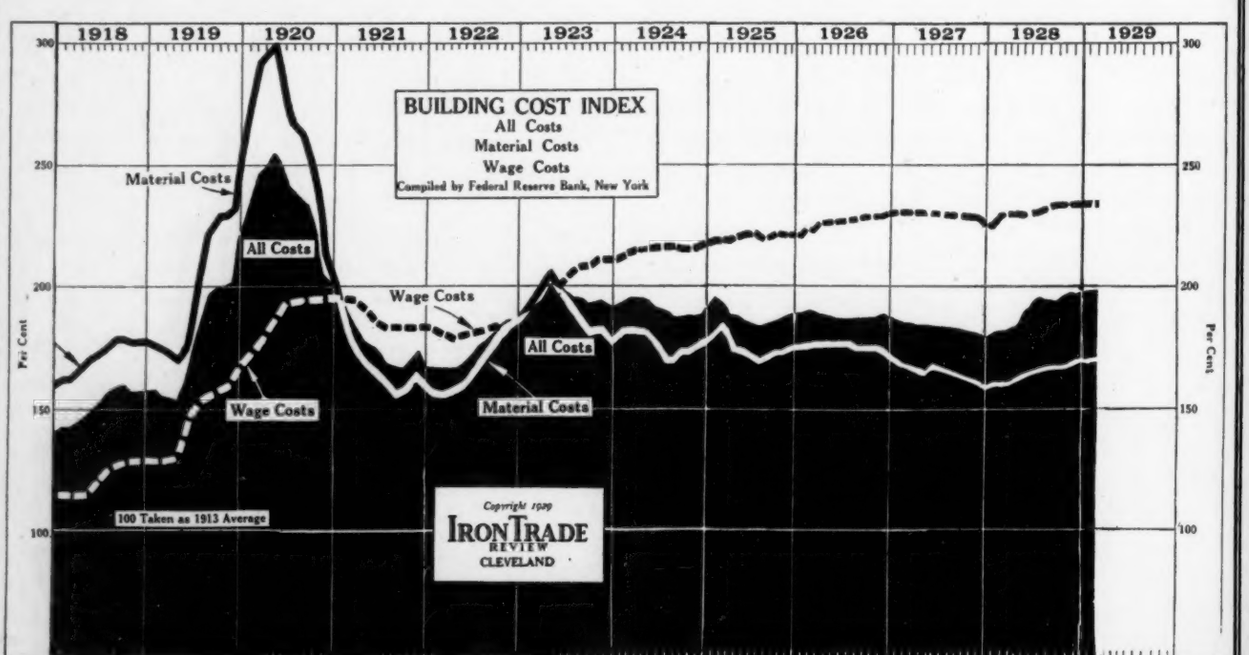


Steel Foreign Trade

TOTAL exports for iron and steel products in February showed a decline compared with the preceding month. The daily average movement for exports, however, was higher in the short month of February. Imports in February of 58,146 tons show a gain over the total of 54,793 tons in January and 48,756 tons in February, 1928. Exports were 259,711 tons, compared with 274,296 tons in January and 185,907 tons in February, 1928. The sharp drop in the exports of scrap was the most important change in the record.

Building Costs

NOTWITHSTANDING the apparent recession in general building activities, costs of building have continued to increase. This is chiefly due to the rise in prices for building materials. The index of building costs, compiled by the Federal Reserve bank of New York, stands at 194 for February, compared with 193 in January. A year ago the index was 186. Material costs stand at an index of 168, compared with 166 one month before and 157 one year ago. Building wages index is 233.



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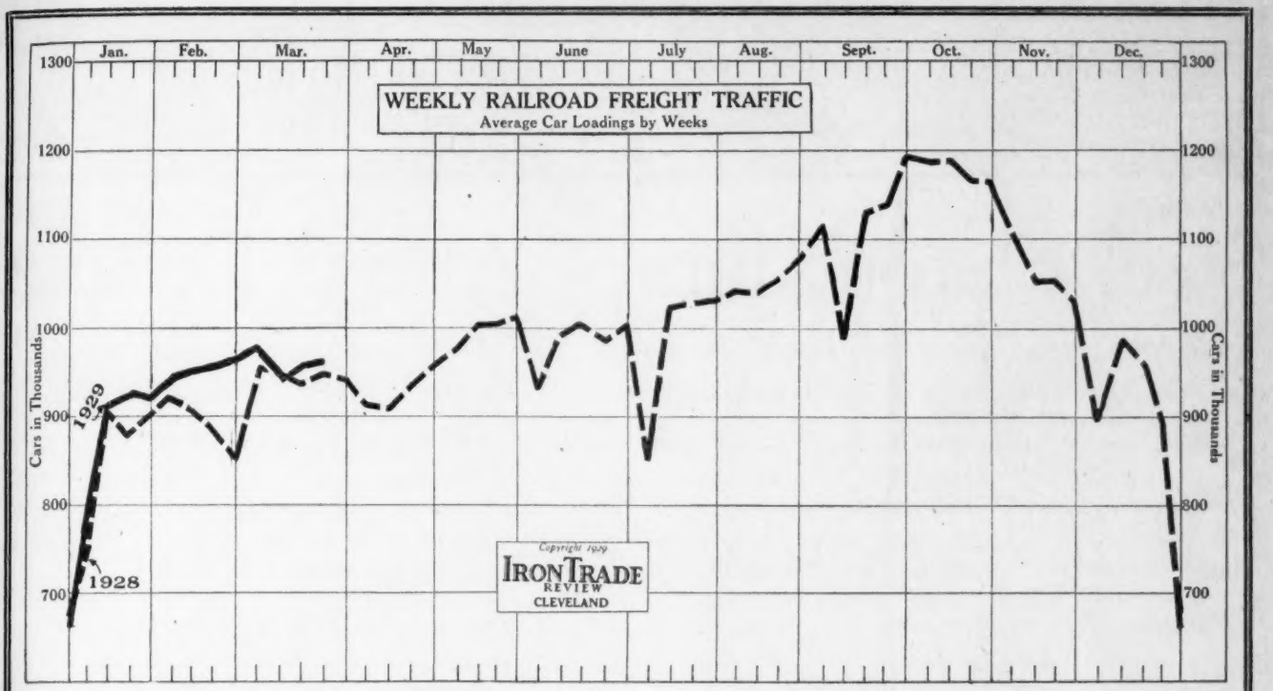
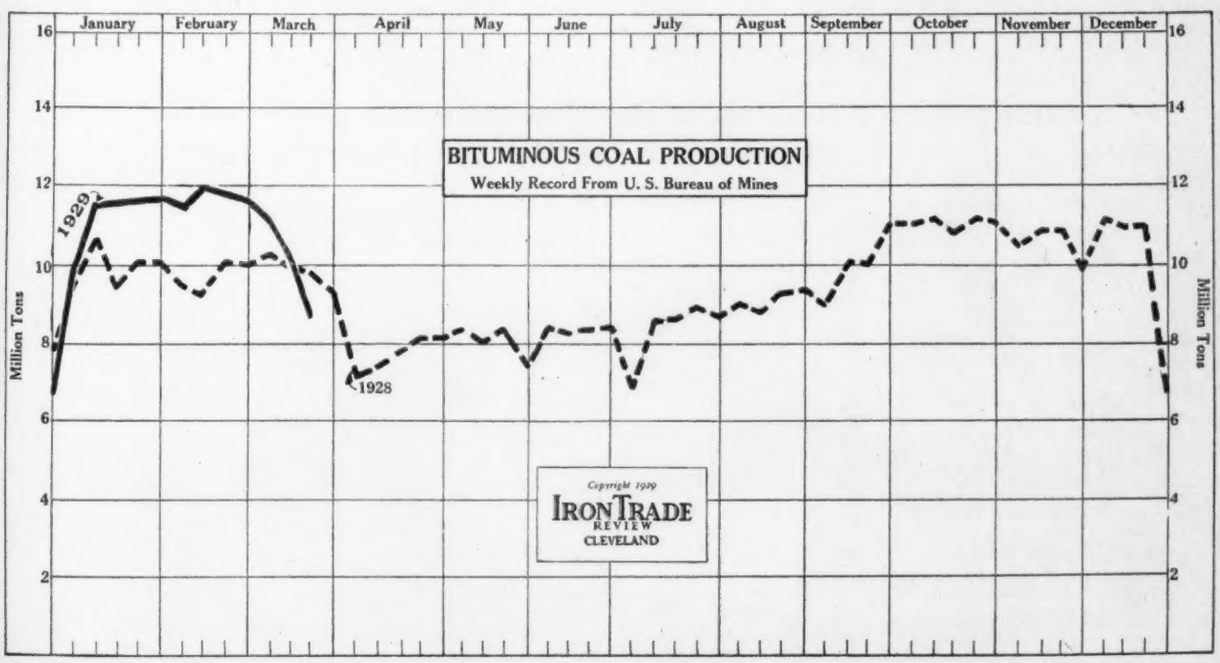


Railroad Freight Traffic

EXPANDING industrial activities are reflected in the higher level of railroad freight traffic. Revenue freight car loadings for the week ended March 23 totaled 960,698 cars. This compares with 957,460 cars one month before and is the second highest total for the year, the peak being reached in the week ended March 2. Loadings of cars not only increased over the preceding week but they also showed a gain of more than 10,000 compared with the corresponding week one year before.

Coal Production

UNSEASONABLY warm weather during March played a part in curtailing the production of soft coal. During the week ended March 23, the output of soft coal declined to about 8,400,000 tons, compared with 9,500,000 tons the preceding week and more than 10,000,000 tons weekly in January and February. Production of coal, which mounted further this year than it did in 1928, has begun its seasonal decline earlier and more sharply than one year ago notwithstanding higher activities in industrial centers.



Steel Output Jumps Ahead Decade

March Ingot Rate at Peak Indicated for 1940—Some Variations in Demand but Aggregate Unchanged—Car Buying Brisk—Prices Strong

STEEL production in March jumped ahead more than a decade. From 1918 to 1928 the increase in the highest daily ingot rate was from 153,298 to 172,144 gross tons, or approximately 19,000 tons. But March, with a daily rate of 194,199 tons, scored a net gain of almost 22,000 tons over the peak of 1928 and attained a height which the trend indicated would not be reached before 1940.

Mills at 103 Per Cent in March

March also was notable in that for the first time open hearth and bessemer ingot output exceeded 5,000,000 tons. At the rate which netted March a total of 5,049,176 tons, 1929 would be a 60,395,000-ton year, or more than 10,000,000 tons over the record of 1928. When steelmaking capacity in March was speeded up to 103 per cent it registered another record for the month.

Despite this record production in March and in the first quarter, when the ingot total soared to 13,849,701 tons, order books of steel producers give no indications that the country's requirements for steel have been exhausted. In general, specifications received by mills in the past week have equalled shipments. For bars, plates and strip, mill capacity is engaged, conservatively, well into May and for the higher finishes of sheets little second quarter material is available.

As is to be expected after three consecutive peak production months, some variations are appearing, and producers themselves foresee a gradual easing off, perhaps after this month. The broad view is that the momentum of the first quarter assures an unprecedented second quarter. The time also approaches when steelmaking equipment, pressed at an average of 95.4 per cent during the first quarter, requires repairs. But at the moment, the incidence of these factors on mill order books is negligible.

Heavy Demand Fortifies Prices

A stronger price situation is one of the heritages of this active steel market. Bars, plates and shapes appear established on the basis of 1.95c, Pittsburgh, and most consumers this quarter will pay $1 per ton more than in the first quarter. There is talk of another rise of $1 for

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	April 10, 1929	March 1929	Jan. 1929	April 1928
PIG IRON				
Bessemer, del. Pittsburgh	$20.26	20.11	19.96	19.26
Basic, valley	18.00	17.60	17.50	16.75
Basic, eastern del., eastern Pa.	20.25	20.25	20.15	19.25
No. 2 foundry, del. Pittsburgh	19.76	19.51	19.36	19.01
No. 2 foundry, Chicago	20.00	20.00	20.00	18.50
*Southern No. 2, Birmingham	15.50	16.00	16.50	16.00
**No. 2X, Virginia furnace	20.75	21.00	21.25	20.50
**No. 2X, eastern del. Phila.	22.26	22.26	22.26	21.26
Malleable, valley	18.50	18.10	18.00	17.25
Malleable, Chicago	20.00	20.00	20.00	18.50
Lake Superior charcoal, del. Chicago	27.04	27.04	27.04	27.04
Gray forge, val., del. Pittsburgh	19.26	19.11	18.76	18.56
Ferromanganese, del. Pittsburgh	109.79	109.79	109.79	104.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville, furnace, ovens	2.75	2.95	2.75	2.60
Connellsville, foundry, ovens	3.75	3.75	3.75	3.65
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	35.00	35.00	34.00	32.75
Sheet bars, open-hearth, Pittsburgh	35.00	35.00	34.00	34.00
Billets, open-hearth, Pittsburgh	34.00	34.00	33.00	33.00
Wire rods, Pittsburgh	42.00	42.00	42.00	44.00

	April 10, 1929	March 1929	Jan. 1929	April 1928
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.95	1.90	1.90	1.85
Steel bars, Chicago	2.05	2.05	2.00	2.00
Steel bars, Philadelphia	2.27	2.27	2.27	2.17
Iron bars, Chicago	2.05	2.00	2.00	2.00
Shapes, Pittsburgh	1.95	1.90	1.90	1.85
Shapes, Philadelphia	2.06	2.01	2.06	2.08
Shapes, Chicago	2.05	2.05	2.00	2.00
Tank plates, Pittsburgh	1.95	1.90	1.90	1.85
Tank plates, Philadelphia	2.15	2.10	2.10	2.10
Tank plates, Chicago	2.05	2.05	2.00	2.00
Sheets, black, No. 24, Pittsburgh	2.95	2.85	2.85	2.75
Sheets, blue anl., No. 10, Pittsburgh	2.20	2.10	2.10	2.05
Sheets, gal., No. 24, Pittsburgh	3.70	3.60	3.60	3.65
Sheets, black, No. 24, Chicago	3.10	3.10	3.00	3.05
Sheets, blue anl., No. 10, Chicago	2.35	2.35	2.25	2.25
Sheets, galvanized, No. 24, Chicago	3.85	3.85	3.75	3.90
*Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
*Wire nails, Pittsburgh	2.65	2.65	2.65	2.60
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.25
*To large jobbers.				
SCRAP				
Heavy melting steel, Pittsburgh	18.75	18.50	19.00	14.85
Heavy melting steel, eastern Pa.	17.00	16.25	16.50	13.75
Heavy melting steel, Chicago	16.00	15.55	16.50	12.75
No. 1 wrought, eastern Pa.	16.25	16.25	15.50	15.25
No. 1 wrought, Chicago	16.75	16.00	14.75	12.45
Rails for rolling, Chicago	17.50	17.50	17.10	14.00

Current Prices for Rolled Steel Products

PRICES IN CENTS PER POUND

STEEL PLATES

Pittsburgh, base	1.95c
Philadelphia, del.	2.15c to 2.25c
New York, del.	2.175c to 2.275c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Coatesville, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.20c to 2.25c
St. Louis, del.	2.27c
Detroit, del.	2.19c to 2.24c

STRUCTURAL SHAPES

Pittsburgh, base	1.95c
Philadelphia, base	2.06c to 2.11c
New York, del	2.195c to 2.245c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c to 2.24c

BARS

SOFT STEEL

Pittsburgh, base	1.95c
Chicago, base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Lackawanna, N. Y., base	2.05c to 2.15c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.95c
Cleveland, del., outside mills	1.95c to 2.00c
Philadelphia, del.	2.27c to 2.37c
New York, delivered	2.29c to 2.39c
Boston, delivered	2.265c to 2.415c
Detroit, del.	2.19c to 2.24c
Pittsburgh, cold finishing	2.05c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.05c to 2.15c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.25c to 2.30c
Stock lengths from mill	2.00c to 2.05c
Chicago, billet	2.35c to 2.40c
Chicago, rail steel	2.00c to 2.05c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.57c to 2.62c

SHEETS

SHEET MILL BLACK

No. 24, Pittsburgh, base	2.85c to 2.95c
No. 24, Philadelphia, delivered	3.27c
No. 24, Gary, Indiana Harbor	3.05c
No. 24, Chicago, delivered	3.10c
No. 24, Birmingham, base	3.10c
No. 24, St. Louis, del.	3.27c
No. 24, Pacif. coast ports, c.i.f.	3.50c

TIN MILL BLACK

No. 28, Pittsburgh, base	3.00c
No. 28, Gary, base	3.10c

GALVANIZED

No. 24, Pittsburgh, base	3.60c to 3.70c
No. 24, Philadelphia, delivered	4.02c
No. 24, Gary, Indiana Harbor	3.80c
No. 24, Chicago, delivered	3.85c
No. 24, Birmingham, base	3.85c
No. 24, St. Louis, del.	4.02c
No. 24, Pacif. coast ports, c.i.f.	4.25c

BLUE ANNEALED

No. 10, Pittsburgh, base	2.10c to 2.20c
No. 10, Philadelphia, delivered	2.42c to 2.52c
No. 10, Gary, Indiana Harbor	2.30c
No. 10, Chicago, delivered	2.35c
No. 10, Birmingham, base	2.35c
No. 10, St. Louis, del.	2.52c
No. 10, Pacif. coast ports, c.i.f.	2.725c

AUTOMOBILE

No. 20, Pittsburgh, base	4.10c
No. 20, Detroit, delivered	4.39c

FURNITURE

No. 24, Grade A, Pittsburgh	4.00c to 4.10c
No. 24, Grade B, Pittsburgh	3.80c to 3.90c

(Turn to the following page)

the third quarter. Advances on sheets and wire products are taking hold. Chicago district consumers of semifinished steel are paying more than the open market for the limited supplies available. Exceptions to firm prices occur in concrete bars at Chicago and beehive furnace coke.

Automotive requirements still dominate the steel markets. Some uneasiness is apparent concerning the over-production of some manufacturers, but on the whole specifications from this industry have not contracted. Structural steel demand continues slightly disappointing, but awards this week approximate 80,000 tons and some large projects are shaping up. Implement production is more variable. Fencing and other wire products are moving more vigorously.

Nearly 4000 Cars Are Placed

Railroad buying of the past week included 3800 freight and passenger and 120 miscellaneous cars, bringing the year's equipment buying to date in excess of all last year. An inquiry of the Baltimore & Ohio railroad calls for 3000 cars. Secondary track material purchases at Chicago the past week included 15,000 tons of rails and 4000 tons of fastenings.

Plate specifications of carbuilders at Chicago have reached the highest point of the year. Demand at Pittsburgh is better than a month ago, and in that district 40 barges, taking 23,000 tons, chiefly plates, have been ordered. Plate deliveries at Chicago continue twelve weeks deferred, but on some sizes of bars deliveries have eased somewhat. Pressure for structural material also is a shade lighter.

The largest pipe order of the year—145,000 tons for the Mississippi River Fuel Corp.—has been distributed among three makers.

Iron Sales Light But Shipments Large

Heavy shipments mark the pig iron situation as most melters have covered for the second quarter. At Chicago some consumers are expanding their requisitions and some buying extends into the third quarter. Lower lake furnaces are pressed to meet the needs of automotive foundries. Sales in the East are moderate. Except in the Mahoning valley, where the price on malleable has wavered, the tone of pig iron prices is strong. Beehive furnace coke is now at $2.75.

Due partially to increased rates at tin plate mills, operations of Steel corporation subsidiaries have moved up one point, to 98 per cent. With independent producers at 94 per cent, the entire steel industry is averaging 96 per cent this week. These percentages are conservative and usually are lower than official monthly statistics. Chicago district steelmakers hold at 98 per cent, Pittsburgh at 95 and Buffalo at 90. Mahoning valley mills are regaining their stride after interruptions last week due to heat and storms.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This Week (April 10, 1929)	$36.81
Last week (April 3, 1929)	36.57
One month ago (March, 1929)	36.42
Three months ago (January, 1929)	36.24
One year ago (April, 1928)	35.67
Ten years ago (April, 1919)	48.45
Fifteen years ago (April, 1914)	23.39

Higher prices on sheets, except autobody, are reflected in the IRON TRADE REVIEW composite of fourteen leading iron and steel products, which advanced 24 cents this week to $36.81, the highest since mid-May, 1927.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

Tubular Products Quoted On Last Editorial Page—See Preceding Page For Other Products

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	2.00c
Hot strip 6 1/8 to 24-in., Pitts.	1.90c
Hot rolled strip, 12 to 24-inch 16 gage and heavier, coils or cut length, 1.90c plate basis, or 2.10c blue annealed basis.	
Hot strip, bands 6 in. and under, Chicago	2.10c to 2.30c
Do, 6 1/8 to 24 in.	2.00c to 2.10c
Cooperage stock	2.20c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve. (3 ton and over)	2.75c to 2.85c
Worcester, Mass. (3 tons and over)	3.10c to 3.20c

ALLOY STEEL

Hot Rolled

F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net, 100 lb. bars
2000	0.25	$3.00
2100	0.55	3.30
2300	1.50	4.25
2500	2.25	5.00
3100	0.55	3.30
3200	1.35	4.10
3300	3.80	6.55
3400	3.20	5.95
4100 0.15-0.25 Mo.	0.50	3.25
4100 0.25-0.40 Mo.	0.70	3.45
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.80
5100 0.60-0.90 Cr.	0.35	3.10
5100 0.80-1.10 Cr.	0.45	3.20
5100 Chrome Spring	0.20	2.95
6100 Bars	1.20	3.95
6100 Spring Steel	0.95	3.70
Chrome Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70
9250 (flats)	0.25	3.00
9250 (rounds squares)	0.50	3.25

COLD FINISHED STEEL

Cold finished steel bars drawn or rolled, Pitts., Chi., c.l.	2.30c
Do, del. Detroit	2.575c
Shafting (turned, polished) Pittsburgh	2.30c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.65c to 3.10c
Cold finished steel bars, Cleve.	2.25c to 2.35c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland, Ironton base (Per pound)	Dealer trade	Large jobbers
Bright plain wire, 6 to 9 gage	2.60c	2.50c
Annealed field wire	2.75c	2.65c
Galvanized wire	3.20c	3.10c
Barbed wire, galvanized	3.40c	3.30c
(Per 100-pound keg)		
Wire nails	$2.75	$2.65
Galvanized nails	4.75	4.65
Polished staples	3.20	3.10
Galvanized staples	3.45	3.35
Cement coated nails	2.75	2.65
Manuf. wire, del. Detroit		2.735c
Wire nails, del. Detroit		$2.885

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Worcester, Mass., Fairfield, Ala., $3 higher.

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Anderson, Ind., $1 higher, Chicago $2 higher, Duluth, Birmingham $3 higher.

CUT NAILS, CHAIN PILING

Cut nails, c.l., f.o.b. mills	2.75c
Cut nails, l.c.l. f.o.b. mills	2.85c
Chain, 1-in., proof coil, Pitts.	6.00c
Sheet piling, base, Pittsburgh	2.25c

CAST IRON WATER PIPE

Prices per net ton

Class B pipe

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	49.20 to 50.20
Six-inch to 24-inch, Chicago	45.20 to 46.20
Four-inch, New York	41.80 to 43.80
Six-inch and over, New York	38.80 to 40.80
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20 gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN AND TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24.. 4.00c to 4.10c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.70 to 6.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relaying rails, St. Louis	$24.00 to 31.00
Relay rails, Pitts., 60 to 90 lb.	$22.00 to 27.00
Light rails, 25 to 45, mill	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand, jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.

Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.

Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off

Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 20, 10 and 5 with 2½ off in bulk.

Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	85-off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts-Cleve.	3.10c
Structural, c.l. Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED MATERIAL

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$34.00
Pittsburgh, bessemer	34.00
Youngstown	34.00
Cleveland	34.00
Philadelphia	39.30
Chicago	35.00
Forging, Chicago	40.00
Forging, Pittsburgh	38.00 to 39.00
Forging, Philadelphia	44.30

SHEET BARS

Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00
Chicago	35.00

SLABS

Pitts., Young., and Cleve.	$34.00

WIRE RODS

Pittsburgh, Cleveland	$42.00
Chicago	43.00

SKELP

All grades, Pittsburgh	1.90c to 1.95c

IRON ORE

LAKE SUPERIOR ORE

Per Gross Ton, Lower Lake Ports

Old range bessemer, 51½%	$4.80
Mesabi bessemer, 51½%	4.65
Old range nonbessemer, 51½%	4.50
Mesabi nonbessemer, 51½%	4.50

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	8.00
Copper free low phosphorus 58 to 65 per cent	nominal

FOREIGN ORE

Cents per unit, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-8% manganese	10.50 to 11.00
North African low phosphorus	11.50 to 11.75
Swedish foundry or basic, 65%	9.00 to 10.00
Spanish and North African basic, 50 to 60 per cent	10.00 to 11.00
Newfoundland foundry, 55%	8.50 to 9.00
Tungsten spot and early fut., short ton unit, duty paid	$13.00 to 14.00

MANGANESE ORE

Prices do not include duty of 1 cent per pound of metallic manganese contained.

Brazilian	34 to 36 cents
Indian	34 to 36 cents
Caucasian, (53-55 per cent)	36 to 38 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, imported duty paid east. tide., gross ton	$20.40

REFRACTORIES

FIRE CLAY BRICK

Per 1000 f.o.b. works

First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK

Pet Net Ton

9 x 4½ x 2½	65.00

MAGNESITE

Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00

CHROME BRICK

Net ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Pig Iron

Volume of New Business Drops, with Melters Covered for Second Quarter—Shipments Continue at High Point—Prices Firm

NEW pig iron buying is less vigorous than in recent weeks, mainly because melters have covered their requirements three to four months ahead. Some supplemental orders for second quarter and spot buying for filling in purposes are noted. The feature of the market is its underlying strength, maintained by heavy shipments, which in some districts continue near the peak. As pressure for delivery continues the tone of the market becomes stronger, though actual quotations were unchanged in the past week. All Buffalo furnaces, however, now are on a minimum basis of $19 for eastern shipment. On the other hand, some sales of malleable are reported below $18.50, valley, the recent maximum. Blast furnaces have sufficient backlogs for ten weeks.

PITTSBURGH, April 9.—A number of orders for pig iron are being received, but the market is featured more by heavy specifications than new business, as most consumers have covered for second quarter. New bookings generally are confined to small lots, with occasional orders for 300 to 500 tons. One sale of 1000 tons of car wheel iron is reported. A 500-ton order for malleable was booked by a furnace at $18.50, valley. Some sales of the latter grade are heard of at a lower figure. Sales of bessemer iron are light, but $18.50 is the general price. Basic iron is quiet. Furnaces report pressure from consumers for deliveries, and shipments against contracts are heavy. Backlogs, however, are well maintained.

Boston, April 9.—Following recent heavy demand for pig iron the market is quiet. About 2000 tons was booked in the past week. Prices are firm.

The Mystic Iron Works, New England's blast furnace, is beginning the production of malleable iron, in addition to foundry grades.

New York, April 9.—All sellers now seem to have adopted the recent advances on pig iron. The market in this district is $19, base, Buffalo, for foundry iron. This is equivalent to $22.28 to $23.91, delivered in this district, including the freight rates to different points, ranging from $3.28 to $4.91. To a few of the points taking the higher rates, a saving is effected by shipping the iron by barge from Buffalo to New York harbor and then trans-shipping by rail to destination. On such water shipments the barge rate to New York harbor usually is $2.25.

Buffalo, April 9.—The New York Air Brake Co. is taking prices on 2000 tons of iron. Other inquiry is small. Prices show firmness, with $19.50 asked for New York state foundry, and eastern business subject only to a 50-cent shading. All furnaces are booked heavily for this quarter.

Youngstown, O., April 9.—Absorption of current blast furnace production by steelworks and other activities is permitting only small additions to stocks at furnaces, which have become much depleted. Hence, routine demand for small lots of various grades of pig iron is welcomed by such sellers as still have iron available for customers' use. Bessemer and malleable grades hold to $18.50, valley, and No. 2 foundry and basic to $18.

Cincinnati, April 9.—Buying of pig iron is light. One furnace reported total sales of 2000 tons. Some northern furnaces are quoting prices 50 cents above the present market for third quarter shipment, but no orders have been placed. This is the result of the increase in ore prices. Southern iron sellers report a quiet market.

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$18.50
Bessemer, del. Pittsburgh	20.26
Basic, valley furnace	18.00
Basic, del. Pittsburgh	19.76
Basic, Buffalo furnace	17.50
Basic, del. eastern Pa.	20.25 to 20.50
Malleable, valley furnace	18.50
Malleable, del. Pittsburgh	20.26
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	22.26 to 22.91
Malleable, Granite City fur.	20.50
No. 1 foundry, Chicago furnace	20.50
No. 1X, eastern del., Phila.	22.76
No. 1X, Buffalo furnace	21.00
No. 2 foundry, valley furnace	18.00
No. 2 foundry, del. Pittsburgh	19.76
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy. Cleve. fur. for local del.	19.00
No. 2 plain, del., Phila.	21.76
No. 2 plain, Virginia furnace	20.75
No. 2 plain, Buffalo, del. Boston	22.91 to 23.91
No. 2 plain, N. J., tidewater	22.28 to 22.78
No. 2 Alabama, Bir. base	15.50
No. 2 Tenn., Birmingham base	15.50
No. 2 Tenn., del. Cincinnati	19.19
No. 2 Alabama, del. Cincinnati	19.19
No. 2 Alabama, del., Chicago	21.51
No. 2 Alabama, del., Cleveland	21.76
No. 2 Alabama, del. St. Louis	19.92
No. 2X, east, N. J., tidewater	22.78 to 23.28
No. 2X, eastern, del. Phila.	22.26
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	23.41
No. 2X, Virginia furnace	20.25 to 20.75
Gray forge, val., del. Pittsburgh	19.26
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.26 to 24.76
Low phos., copper bearing fur.	23.00 to 23.50
Charcoal, Superior, del., Chicago	27.04

CANADIAN PRICES

No. 2 foundry, del. Toronto	24.10
No. 2 foundry, del. Montreal	25.50 to 26.00
Malleable, del. Toronto	24.10
Malleable, del. Montreal	25.50 to 26.00
Basic, del. Montreal	24.50 to 25.00

Silvery iron, Jackson county, O., furnaces, in per cents: 5—$23 to $24; 7—$25 to $26; 8—$26 to $27; 9—$27 to $28; 10—$29 to $30; 11—$31 to $32; 12—$33 to $34; 13—$35 to $36.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$31 to $32; 11—$33 to $34; 12—$35 to $36; 13—$37 to $38; 15—$41.50 to $42.50; 16—$43 to $44.

A central Ohio buyer is inquiring for 1500 tons of northern iron for second quarter.

St. Louis, April 9.—Steady purchasing of pig and close to record shipments feature the market in this district. The melt continues to gain from week to week, and is expected to continue upward at least until the end of May. Certain grades of iron are scarce. Prices are steady. Sales reported the past few days total 7000 tons, of which 4100 tons was booked by the St. Louis Gas & Coke Corp. An Evansville jobbing and specialty shop purchased 2000 tons for second quarter, and 1000 tons went to a local machinery builder.

Cleveland, April 9.—The pig iron market is quieter, following recent heavy sales. Shipments are holding up to the March average, and prices remain firm. The total of sales booked by furnace interests with headquarters in Cleveland was 25,150 tons in the past week, compared with 65,000 tons in the week preceding and 41,000 tons in the week before that. The week's volume is the lowest in over two months, as melters generally have covered for second quarter. While prices are unchanged there is a stronger feeling in the market. Cleveland furnaces hold to $18.50, base, furnace, for outside shipment, and $19, base, for local delivery. One producer, however, is quoting $19, base, on some inquiries for southern Ohio, merely because it is booked practically full for second quarter. Substantial sales continue to be made at the new prices of $20.50, base, lake furnace, for foundry and $21 for malleable, in western Ohio, Indiana and lower Michigan.

Chicago, April 9.—Pressure for deliveries of pig iron is unchecked as furnace output continues behind shipments, which are equivalent to the March rate. Several additional producers of large castings have ordered iron for delivery extending through July and August. Supplemental buying for second quarter is moderately heavy. Numerous buyers are increasing their earlier shipping requisitions. Blast furnaces are planning to maintain their present full operations for some months, unless repairs become necessary. The Chicago furnace price is steady at $20 for the base grades.

Birmingham, Ala., April 9.—Pig iron selling is slow, production steady and

(*Concluded on Page* 1027)

The Market Section

Coke

Beehive Furnace Fuel Continues to Decline—Demand for Foundry Coke Increases

WHILE demand for beehive foundry coke has increased slightly, beehive furnace fuel is quiet and prices have eased to a minimum of $2.75. Some of the smaller operators are reducing output and offering surplus at concessions. Merchant coke output in the Connellsville district is back to the level of the middle of February. By-product coke prices are steady.

Pittsburgh, April 9.—The market for beehive furnace coke is dull, and with lack of spot demand prices are largely nominal. Small operators who started ovens during the recent strong market are decreasing production, and are making sharp concessions to sell their surplus. The market generally is no lower than $2.75, at which fair tonnages are available. Consumption is steady and shipments against contracts continue heavy. Foundry coke demand is slightly more active at unchanged prices. The total coke production by merchant interests is now down to the level of the middle of February, with operations by blast furnace company's ovens higher than two months ago.

Production of coke in the Connellsville region for the week ended March 30 was 73,765 tons, compared with 78,640 tons the preceding week, according to the *Connellsville Courier*.

Boston, April 9.—The situation in coke is unchanged. Foundries continue to take a fair supply, indicating that operations are holding up. Prices are steady.

New York, April 9.—While demand for spot foundry coke is comparatively small, specifications for shipment against first half contracts are active. By-product foundry coke continues $11, delivered in New England; $9 to $9.40 delivered at Newark, N. J., and, $9 delivered at Philadelphia. Connellsville beehive foundry coke continues $3.75 to $4, Connellsville, to consumers in this district. Beehive foundry coke from Latrobe, Pa., continues $4.85, ovens. Beehive furnace coke continues $2.75 to $3, Connellsville, to consumers in this territory.

Cincinnati, April 9.—New business in by-product foundry coke has eased slightly. Shipments are satisfactory and specifications against general contracts are good. Beehive foundry coke is firm.

St. Louis, April 9.—Shipments of metallurgical coke are large, to melters in this district and to the Southwest. By-product ovens are operating full. Demand from industrial users is especially active. Prices are steady.

Birmingham, Ala., April 9.—Independent producers are watching coke production steadily, though maximum output is not being obtained. Foundry coke still is moving to the Middle West. The foundry grade is $5, base, ovens.

Coke Prices

Prices pet Net Ton

Beehive Ovens	
Connellsville furnace	$2.75 to 2.85
Connellsville foundry	3.75 to 4.85
New River foundry	6.00 to 6.50
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.75
By-Product Foundry	
Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell. basis	6.50
Portsmouth, O., ovens, Connell, basis	6.50
Buffalo, ovens	8.75
Detroit, ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Shipments Continue Near Peak Rate —New Business Quiet

Pittsburgh, April 9.—Specifications for ferroalloys so far this month compare favorably with the high rate of March. Shipments for March and the first quarter were at peak levels. New business is quiet, with only several orders for small tonnages from consumers not covered by contracts. The market on ferromanganese and spiegeleisen continues firm, spot business bringing $109.79, delivered, Pittsburgh, and $34, respectively. Prices on special ferroalloys are steady. A few orders for fluorspar have been placed at $18, but the market is not active.

Chicago, April 9.—Shipments of ferroalloys are at a high rate. Final figures show record specifications and shipments of ferromanganese and 50 per cent ferrosilicon for March and also the first quarter. A cargo of English spiegeleisen is reported on the way for trans-shipment from Montreal by way of the Great Lakes.

Valley Operations Rise After Storm Delay

Youngstown, O., April 9.—Resumption of plants yesterday became general, following the interruptions due to the flooded river and broken sewers that came with last Thursday night's series of storms, and the excessive humidity Friday and Saturday. Sheet mill employes especially were affected by the heat. However, this week production starts off at 90 per cent for the entire district.

Two independent open-hearth furnaces went down, making 46 active out of 51 units; but bessemer output has been expanded an almost equal extent. Steel bar production by the independents is at 75 per cent and Carnegie mills are at 85 per cent. One pipe unit went out, making 10 active out of 20 independent seamless and welded units. Strip output is at capacity and tin plate operations are at 85 per cent for both independents and Steel corporation units. One less sheet unit is active this week, making 116 independent units operating out of 125. The Byers puddle and skelp mills at Girard have resumed after a short interruption.

Pittsburgh Rate Holds

Pittsburgh, April 9.—Steelmaking operations in the Pittsburgh district hold to approximately 95 per cent of ingot capacity, unchanged from the rate of the preceding week. Finishing operations generally are unchanged with the exception of a slight increase in tin plate production which now is at about 95 per cent. Sheet output continues close to practical capacity. Strip mills still are running full and tubular mill operations are unchanged at 55 to 60 per cent for welded pipe and 75 to 90 per cent for seamless mills.

Archer H. Brown Is Dead

Archer H. Brown, 47, eldest son of the late Archer Brown, who was a member of Rogers, Brown & Co., died April 7 at his home in Greenwich, Conn., from heart failure. Leaving Princeton university on the death of his father in 1904, Mr. Brown became affiliated with the operating end of the Empire Steel & Iron Co., and was a director at the time of its absorption in 1922 by the Replogle Steel Co. At the time of his death he was associated with Porter McConnell & Co., New York, investment bankers.

Ferroalloy Prices

(In dollars, except ferrochrome)

Ferromanganese, 78 to 82 per cent, tidewater, duty paid	$105.00
Ferromanganese, del. Pittsburgh	109.79
Spiegeleisen, 19 to 21 per cent, domestic furnace, spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do, less carload	88.50
Do., 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.25
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload, producer's plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Quantity diff. apply on 100 tons and over.
*These prices contract, spot $5 higher.

The Market Section

Scrap

Strength Returns and Prices Are Advancing — Supply Continues Short—Dealers Hold Firm

WITH consumption at a continued high rate and production relatively low, a scarcity of some grades of iron and steel scrap is lending strength to the market. Dealers are slow to sell and producers are equally slow to allow their tonnages to move at present prices, while consumers are resisting prices.

Chicago, April 9.—With limited offerings and high rate of consumption, prices on iron and steel scrap remain strong. All dealers report heavy bookings and active interest from consumers. Shipments are continuing steadily, with no holdups asked. Despite indications that more scrap will be released from railroads and from industrial lines the market apparently is not discounting the probable liberal offerings later. Several prices have advanced 25 to 50 cents. Heavy melting steel is quoted as high as $16.25 to $16.75 by some dealers. Santa Fe railroad melting steel closed at $17, gross, delivered, several days ago, and sale to a steelworks of melting steel not ordinarily given rigid inspection, at $16, has been made. Despite recent weakness in cast borings dealers have held out for higher quotations, and a sale to a leading borings consumer in this district has been made at $11, an advance of 50 cents over recent prices. Gray iron foundry grades are fairly active and high prices are obtained by dealers. Malleable and electric furnace grades also obtain high prices. Consumer resistance to prices is not marked.

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except Detroit where dealers' buying prices are shown

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	12.00 to 12.50
Boston, dealers	12.75 to 13.00
Boston, No. 2	10.00 to 10.50
Buffalo, No. 1	17.25 to 17.75
Buffalo, No. 2	14.75 to 15.00
Chicago	16.00 to 16.50
Cincinnati, deal.	13.50 to 14.00
Cleveland, No. 1	15.50 to 16.00
Cleveland, No. 2	15.00 to 15.50
Detroit, No. 1	14.25 to 14.50
Detroit, No. 2	12.25 to 12.75
East Pa., del. mill	17.00
N. Y., deal., R. R.	13.00 to 13.50
N. Y., deal., yd.	8.50 to 9.50
Pittsburgh, No. 1	18.50 to 19.00
Pittsburgh, No. 2	16.50 to 17.00
St. Louis, No. 1	14.00 to 14.50
Valleys, No. 1	18.00 to 18.50

COMPRESSED SHEETS

Buffalo	15.50 to 16.50
Chicago	14.00 to 14.50
Cleveland	15.00 to 15.50
Detroit	14.00 to 14.25
E. Pa. new mat.	14.50
Pittsburgh	18.50 to 19.00
Valleys	18.00 to 18.25

BUNDLED SHEETS

Buffalo	12.75 to 13.25
Cincinnati, deal.	11.00 to 11.50
Cleveland	13.00 to 13.50
Eastern Pa.	11.50 to 12.00
Pittsburgh	17.00 to 17.50
St. Louis	10.00 to 10.50

SHEET CLIPPINGS LOOSE

Chicago	8.50 to 9.00
Cincinnati	9.75 to 10.25
Detroit	9.25 to 9.75
St. Louis	10.00 to 10.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston	11.25 to 12.25
Buffalo	19.00 to 20.00
Chicago (3 feet)	19.00 to 19.50
Chicago, 2 ft. and under	20.00 to 20.50
Cincinnati, deal.	19.00 to 19.50
Detroit	17.00 to 17.50
Pittsburgh (3 ft.)	21.00 to 21.50
Pittsburgh, 2 ft. and under	21.50 to 22.00
St. Louis	16.75 to 17.25

STOVE PLATE

Birmingham	13.00 to 13.50
Boston consumers	11.50 to 12.00
Buffalo	14.25 to 14.75
Chicago, net	12.75 to 13.25
Cinn., deal., net	10.00 to 10.50
Detroit, net	9.50 to 10.00
Eastern Pa.	13.00 to 13.50
N. Y. deal., mill	8.75 to 9.00
Pittsburgh	12.50 to 13.00
St. Louis	13.75 to 14.25

ANGLE BARS—STEEL

Chicago	17.50 to 18.00
St. Louis	14.75 to 15.25

COUPLERS, SPRINGS

Buffalo	19.00 to 20.00
Chicago	17.00 to 17.50
Eastern Pa.	20.00 to 21.00
Pittsburgh	22.00 to 22.50
St. Louis	15.75 to 16.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	19.50 to 20.50
Eastern Pa.	21.00 to 22.00
Pitts. billet and bloom crops	23.50 to 24.00
Cleve. billet and bloom crops	17.50 to 18.00

FROGS, SWITCHES, GUARDS

Chicago	17.00 to 17.50
St. Louis	15.50 to 16.00

SHOVELING STEEL

Chicago	16.00 to 16.50
Cleveland	11.75 to 12.00
Detroit	10.75 to 11.00
Pittsburgh	18.50 to 19.00
St. Louis	13.50 to 14.00

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.50 to 11.50
Boston, dealers	12.25 to 12.50
Yard wrought	9.50 to 10.00
Buffalo, No. 1	13.50 to 14.00
Buffalo, No. 2	16.00 to 17.00
Chicago, No. 1	16.75 to 17.25
Chicago, No. 2	16.00 to 16.50
Cinn., No. 2	13.50 to 14.00
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 1	14.50 to 15.50
Pittsburgh, No. 2	18.50 to 19.00
St. Louis, No. 1	13.75 to 14.25
St. Louis, No. 2	13.75 to 14.25

SPECIFICATION PIPE

Boston	11.00 to 11.25
Eastern Pa.	15.50 to 16.00
New York, deal.	11.25 to 11.75

BUSHELING

Buffalo, No. 1	15.50 to 16.50
Chicago, No. 1	14.00 to 14.50
Cinn., No. 1 deal.	11.00 to 11.50
Cinn. No. 2	8.00
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	11.00 to 11.50
Detroit, No. 1	12.00 to 12.50
St. Louis, No. 1	10.00 to 10.50

MACHINE SHOP TURNINGS

Birmingham	8.00 to 8.50
Boston	6.25 to 6.50
Buffalo	8.00 to 8.50
Chicago	9.00 to 9.50
Cincinnati, deal.	9.00 to 9.25
Cleveland	9.50 to 10.00
Detroit	7.25 to 7.50
Eastern Pa.	11.50
New York, deal.	8.00
Pittsburgh	11.00 to 11.50
St. Louis	8.00 to 8.50
Valleys	11.50 to 12.00

MIXED BORINGS, TURNINGS

For blast furnace use

Boston, dealers	6.50 to 7.00
Buffalo	11.75 to 12.25
Cincinnati, deal.	9.25 to 9.75
Cleveland	11.00 to 11.50
Detroit	9.00 to 9.25
Eastern Pa.	10.00 to 10.50
New York, deal.	6.50 to 7.00
Pittsburgh	12.00 to 13.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	8.00 to 8.50
Boston, chem.	10.00 to 10.50
Boston, dealers	6.50 to 7.00
Buffalo	11.75 to 12.25
Chicago	10.50 to 11.00
Cincinnati, deal.	9.25 to 9.75
Cleveland	11.00 to 11.50
Detroit	9.00 to 9.25
Eastern Pa.	11.00 to 11.50
Eastern Pa., chem.	14.50 to 15.00
New York, deal.	7.25 to 7.75
Pittsburgh	12.00 to 13.00
St. Louis	9.50 to 10.00

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	13.00 to 13.50
Chicago, net	12.50 to 13.00
Cincinnati	10.00 to 10.50
Eastern Pa.	13.00 to 13.50
New York, deal.	9.25 to 9.75
St. Louis	13.00 to 13.50

FORGE FLASHINGS

Boston, dealers	10.50 to 11.00
Buffalo	13.75 to 14.25
Chicago	10.50 to 11.00
Cleve., over 10 in.	13.00 to 13.50
Detroit	12.00 to 12.50
Pittsburgh (light)	15.00 to 15.50

FORGE SCRAP

Boston, dealers	9.00 to 9.50
Chicago	18.50 to 19.00
Eastern Pa.	13.50 to 14.00

ARCH BARS AND TRANSOMS

Chicago, net	21.50 to 22.00
St. Louis	22.50 to 23.00

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal	6.75 to 7.00
Buffalo	14.50 to 15.00
Chicago	13.00 to 13.50
Cleveland	12.50 to 13.00
Eastern Pa.	15.00 to 16.00
Pittsburgh	16.50 to 17.50
St. Louis	12.00 to 12.50

STEEL CAR AXLES

Birmingham	18.00 to 19.00
Boston, ship point	17.00 to 17.50
Buffalo	19.00 to 20.00
Chicago	19.60 to 20.15
Eastern Pa.	22.75 to 23.00
Pittsburgh	21.00 to 22.00
St. Louis	21.00 to 21.50

SHAFTING

Boston, ship point	14.50 to 14.75
Chicago	17.35 to 17.90
Eastern Pa.	19.00 to 20.00
New York, deal.	15.00 to 15.50
St. Louis	18.50 to 19.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	12.00 to 13.00
Boston, iron	14.00 to 14.50
Buffalo, iron	14.00 to 14.50
Buffalo, steel	19.00 to 20.00
Chicago, iron	15.00 to 15.50
Chi., rolled steel	19.00 to 19.50
Cincinnati	12.50 to 13.00
Eastern Pa. cast	16.50 to 17.00
Eastern Pa., rolled	19.00
N. Y., iron, deal.	12.50 to 13.00
Pittsburgh, iron	16.25 to 16.75
Pittsburgh, steel	22.00 to 22.50
St. Louis, iron	15.00 to 15.50
St. Louis, steel	17.50 to 18.00

No. 1 CAST SCRAP

Birmingham, cup.	14.00 to 14.50
Buffalo	17.00
Boston, textile	16.00 to 16.50
Chicago, mach.	17.90 to 18.50
Chicago, railroad	16.80 to 17.35
Chicago, agri.	16.25 to 16.80
Cincinnati, mach. cupolas, gross	19.50 to 20.00
Cleveland, cupola	16.50 to 17.00
Detroit, net	13.00 to 13.50
East. Pa., cupola	16.00 to 17.00
N. Y., cup., deal.	13.00 to 13.50
N. Y., del. local foundries	17.00 to 17.50
Pittsburgh, cupola	15.50 to 16.00
San. Fran., del.	13.50 to 14.00
Seattle	15.50 to 16.00
St. L. No. 1 mach.	15.50 to 16.00
St. Louis, No. 1	15.00 to 15.50
Valleys	16.50 to 17.00

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	13.00 to 13.50
Cleve., breakable	12.50 to 12.75
Detroit, auto., net	18.00 to 18.50
Detroit, breakable	9.50 to 10.00
Eastern Pa.	16.00
New York, deal	11.75 to 12.50
Pittsburgh	13.50 to 14.00

MALLEABLE

Boston, railroad	16.50 to 17.00
Buffalo	14.50 to 15.00
Chicago, agri.	15.50 to 16.00
Chicago, railroad	19.00 to 19.50
Cinn., R. R., deal.	15.50 to 16.00
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	16.00 to 16.50
Detroit, auto	14.00 to 14.50
St. Louis, rail	16.50 to 17.00

Miscellaneous Scrap

RAILS FOR ROLLING

5 feet and over

Birmingham	14.00 to 15.00
Boston, dealers	12.00 to 12.75
Rails scrap, Boston	11.00 to 12.25
Skeleton, Boston	9.50 to 10.00
Buffalo	16.50 to 17.00
Chicago	17.50 to 18.00
Eastern Pa.	18.00 to 18.50
New York	14.00 to 14.50
Pittsburgh district	18.00 to 18.50
St. Louis	16.00 to 16.50

LOCOMOTIVE TIRES

Chicago, cut	19.00 to 19.50
St. Louis, No. 1	15.50 to 16.00

LOW PHOS. PUNCHINGS

Chicago	18.00 to 18.50
Pittsburgh	21.50 to 22.00

The Market Section

A large tonnage of heavy melting steel was sold today at $16.50 and the market now is quotable at $16 to $16.50.

Boston, April 9.—Prices held steady for all scrap materials in the past week. There is a growing tendency to hold materials. This is because of a belief firmer prices are ahead. Brokers and dealers find little trouble in placing scrap with Pennsylvania mills, but because of lack of supply not much material is moving. Exporters are offering $10.50 a ton for export materials, which has resulted in a little business, but sellers are slow to accept.

New York, April 9.—Substantial tonnages of No. 1 railroad steel scrap continue under negotiation for two eastern consuming points. Heavy melting railroad steel fell 50c per ton, dealers' buying prices ranging $13 to $13.50, New York. All other grades are quiet and unchanged.

Buffalo, April 9.—Prices have assumed a firmer status, material is scarce, and short interests have been a factor in report of sales to district melters at prices fully $1 under spot value of scrap, particularly No. 1 heavy melting steel. Some $18 contracts for this material still have six weeks to run, while dealers also report at least two outlets for No. 1 heavy melting steel which can be turned over at $17.50. Purchases are pending and likely to be completed within a few days. Malleable and low phosphorus are up nearly $1 a ton according to reports of new sales. All scrap is relatively scarce, dealers say.

Pittsburgh, April 9.—Iron and steel scrap presents a strong tone with steelmaking grades scarce and in demand following recent mill purchases. Sales of heavy melting steel at $18.50 and $19 resulted in most dealers naming the latter as a minimum, and some are not interested in business even at this figure. Hydraulic compressed sheets brought the same prices on sales involving about 30,000 tons.

Cincinnati, April 9.—Foundry backlogs and watchful waiting by buyers are keeping the iron and steel scrap market quiet. The market continues steady and no price changes have been made this week.

Cleveland, April 9.—Scrap purchases appear to be confined to dealers. Some mills are buying direct from railroads and automobile plants but most have enough in stock or on order. Consumption is heavy. Blast furnace material is down 25 cents a ton to $11 to $11.50 and the differential between No. 1 and No. 2 heavy melting steel now is 50 cents instead of 25 cents. Machine shop turnings have receded 50 cents.

In Youngstown territory, where as high as $18 to $18.25 still appears to be paid for heavy melting steel, compressed sheets have declined 50 cents to $17 to $17.50.

Detroit, April 9.—Iron and steel scrap prices are unchanged, but a softness is developing in machine shop turnings which may drop the present range of $7.25 to $7.50 within a few days. The heavier grades of scrap, notably melting steel, are somewhat firmer. Interest of Pittsburgh dealers in this market is much more pronounced than that of Youngstown and Cleveland traders.

Canadian Scrap

Dealers' Buying Prices

MONTREAL
Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	6.00
Turnings	6.50
Heavy melting steel	8.00

TORONTO

Steel axles	15.00
Iron axles	17.00
Heavy melting steel	9.50
Turnings	7.50
No. 1 mach. cast (net)	16.00
Malleable (net)	14.00

Philadelphia, April 9.—Consumers have failed to exercise options on heavy melting steel at $18, delivered, and the highest price paid has been $17. Dealers show less optimism and have stopped paying premiums. Steel scrap continues scarce. Several grades have been advanced.

St. Louis, April 9.—Iron and steel scrap continues strong, with all grades active except cast, which has been somewhat sluggish for several weeks. Steel specialties and heavy melting are particularly active.

Rolling mill grades are also in excellent demand, with available tonnage moderate. The steady call for blast furnace material continues. Generally dealers complain of scant profit margins, though the volume of their business is large.

Birmingham, Ala., April 9.—Better feeling is noted in iron and steel scrap, with quotations firm. A small tonnage of heavy melting steel is being shipped from here into Ohio river territory.

Toronto, Ont., April 9.—Following strong demand for some weeks, iron and steel scrap prices have advanced 50 cents to $1 per ton at Toronto, on most grades. Dealers now are offering $15 and $16, gross ton, respectively, for steel and wrought iron axles. Turnings have moved up 50 cents per ton with dealers now offering $7.50. An advance of $1 per ton for machine cast and malleable scrap brings dealers offering price to $16 and $14, net ton, respectively.

Semifinished Steel

Market Strong—Western Consumers Buying from Eastern Mills

SEMIFINISHED STEEL PRICES, PAGE 1012

Pittsburgh, April 9.—Continued high operations of finishing mills prevents any increase in available supplies of semifinished steel. Sheet, strip and bar producers who are required to buy semifinished steel in the open market are encountering difficulty obtaining sufficient supplies to permit capacity operations, and steel producers are turning away all additional business for billets, sheet bars and slabs not required by contracts. First quarter contracts were fully specified and specifications are being received against new contracts. Occasional reports are heard of premiums paid on new business but material is not plentiful. Current prices of $34 for 4 x 4-inch rerolling billets and slabs and $35 for sheet bars are firm. Wire rods are active, with the $42 price steady.

Cleveland, April 9.—While inquiries are received from other districts for sheet bars, billets and slabs, customers' requirements are taking the full output of the leading local producer. Operations continue at 100 per cent, and prices are firm.

Youngstown, O., April 9.—Sheet bars continue in heaviest demand, and rationing continues the rule with all mills. Billets, slabs and wire rods still are in insatiable demand, with outside mills helping out. Sheet bars hold at $35, Pittsburgh and Youngstown, billets and slabs at $34, same bases, and wire rods at $42, Pittsburgh and Cleveland.

Chicago, April 9.—Little semifinished material is available in the open market in this district. It is understood western consumers have been purchasing billets from eastern steelworks at more than the quoted Pittsburgh prices. The price for commercial, or rerolling billets, 4 x 4-inch base, nominally is $35, Chicago, but if material were available for the open market it is said no sales would be made at less than $36 to $37, base. Sheet bars are quoted nominally at $35. Sales of wire rods are reported at $42, Pittsburgh-Cleveland, or $43, Chicago.

Iron Ore

Season's Business Practically Covered —Ford Tonnage Still Pending

IRON ORE PRICES, PAGE 1012

Cleveland, April 9.—Leading producers of Lake Superior iron ore have sold most of their output for 1929. A few consumers are to be heard from. The Ford Motor Co. has not closed on its inquiry for 354,000 tons. Present indications point to the start of vessel shipments by April 15. The Lake Superior Iron Ore association has issued the following report of receipts and shipments from Lake Erie ports for the past 12 months, and the dock balance as of April 1:

	Receipts	Shipments	Dock balance Apr. 1. 1929
Buffalo, N. Tonawanda, Port Colborne	4,337,313	30,409	2,470
Erie	653,233	666,161	59,645
Conneaut	8,437,401	8,652,379	1,320,318
Ashtabula	6,376,035	7,062,580	1,279,618
Fairport	1,839,171	2,011,694	188,090
Cleveland	9,375,764	6,341,579	922,498
Lorain	3,423,111	1,714,704	60,224
Huron	1,010,927	1,079,348	343,434
Toledo	1,503,387	860,059	47,051
Total	36,956,342	28,418,913	4,223,348
Comparative total 1 year previous	36,552,791	27,436,280	5,568,098

The Market Section

Bars

Specifications Continue at Rate of First Quarter—Deliveries Still Long Deferred—Prices Firm

PLACING of additional tonnages during first quarter to care for second quarter needs has not acted to reduce current buying and mills find a large volume of orders coming in now. Deliveries continue deferred several weeks. Prices are being held firmly, being supported by large backlogs. All consuming lines are taking liberal bar tonnages. Automotive needs are heavy.

BAR PRICES, PAGE 1011

Chicago, April 9.—Finished steel specifications generally are unbroken from the rate established during first quarter, and in the week just closed were the second largest of the year. Tonnage of all classes was added to mill books, including further gains in orders from car builders. Contract and spot sales continue to exceed billings, and are at the average weekly rate of the first quarter. Backlogs have spread well over the remainder of first half. Bar tonnage is remarkably well diversified, with automotive and parts buyers leading. Tractor plants are aggressive in their specifications, and producers of harvester-combines and threshing machinery are tending to take up the slack resulting from the completed runs in tillage tool lines. Slight relief is seen in delivery problems of bar mills. Customers' needs can be placed more easily on some rolling schedules, and shipments of certain sizes can be made in eight to ten weeks, against a maximum of 12 weeks recently.

Soft steel bars are quoted on the basis of 2.05c to 2.15c, Chicago. A number of buyers who have been regular mill customers, are taking rush material from warehouses at higher prices. Differentials prevail for tonnage orders from preferred industries.

New York, April 9.—In addition to specifications against first quarter contracts which steel bar mills now are rolling, specifications against second quarter contracts are being filed in large volume. Jobbers and consumers find mills have heavy rolling schedules and need two to four weeks to get out shipments. This situation prevails in alloy as well as carbon steel bars. The market is firm at the new price basis, 1.95c to 2.05c, base, Pittsburgh, equivalent to 2.29c to 2.39c, delivered, New York. On small lots 2.05c is being done freely.

Buffalo, April 9.—Demand for bars is good. Shipping instructions are absorbing full mill output and deliveries are being extended. Only larger lots now command 2.05c, Lackawanna. Ordinary business is being taken at 2.10c.

Pittsburgh, April 9.—Despite placing of a fair volume of business during late first quarter in anticipation of April requirements, specifications against second quarter contracts have been active. Although placing of some tonnage is seen as a precaution to insure delivery of material required three to four weeks hence, most commitments appear for actual requirements. Deliveries on hot-rolled bars continue deferred from three to four weeks although capacity production prevails. Specifications from automotive interests have yet to decline from the peak of recent weeks. Producers are maintaining the 1.95c, Pittsburgh, price on all new business and current backlogs permit them to take a strong stand at this figure.

Cleveland, April 9.—Soft steel bar business with most makers continues to outrun that of the comparable period of March. Automotive demand, while more closely watched, shows no letup. Bolt, nut and rivet makers are starting the second quarter at exceptionally high rates. Local mills quote 1.95c, base, Cleveland, on customary business, while outside mills quote 1.95c to 2.00c, delivered Cleveland.

Superior to New Owners?

Pittsburgh, April 9.—Recent heavy buying of stock of the Superior Steel Corp. is understood to have resulted in change of control, for 35 years lodged with J. H. Hammond and associates. Confirmation, however, is not possible in the absence of important officials. It is reported that a change in ownership does not entail any change in personnel.

Tungsten, the metal of which the filaments of most incandescent lamps now are made, is nearly twice as heavy as lead.

Plates

Requirements Expanding—Car Shop Specifications Heavy—Forty Barges Take 23,000 Tons

THE volume of plate business continues to improve. Car shop specifications in the Middle West are at the highest point of the year. Chicago mill bookings during the week were the second largest since Jan. 1. Forty barges for the Inland Waterways Corp., requiring 23,000 tons of plates and shapes, were divided among three builders. Prices are tending toward greater firmness.

PLATE PRICES, PAGE 1011

Pittsburgh, April 9.—Plate demand shows a moderate expansion compared with the rate a month ago. Business is developing chiefly from railroad car and barge builders. Recent pipe line awards will provide a fair tonnage in this district. Bids were opened April 8 in Washington by the Inland Waterways Corp. on 40 barges requiring 23,000 tons of plates and shapes. Twenty-four of the barges were awarded to American Bridge Co., 11 to Riter-Conley Co., and five to Midland Barge Co. Producers are not interested in plate business below 1.95c, base, Pittsburgh, and the market is fairly well established at this basis on specifications received against new contracts.

Cleveland, April 9.—From a carload to 250 tons represents the usual plate order for protection. Machine and boiler shops are in need of contracts and are curtailing their plate specifications accordingly. A fair amount of tank and locomotive business is developing. The Stacey Mfg. Co. was awarded a 1,000,000-cubic foot gas holder for Houston, Tex., and the Hammond Iron Works obtained 449 tons for tanks for Bayonne, N. J. Mills report that despite the heavy specifications received in late March to close out 1.90c, Pittsburgh, contracts, specifications are active against 1.95c arrangements. Deliveries usually are in three to four weeks.

Chicago, April 9.—More tonnage has been added to mill books, including 4000 tons of oil tankage in one lot for the South. New inquiry includes 1500 tons of oil tank plates for the Pacific coast. Car shop specifications took another jump and now are at the highest point of the season. Total mill orders in the week just closed were the second highest for the year. Active sales are reported for piecing out second quarter requirements and for early third quarter needs. Deliveries are no easier, the maximum being 12 weeks and over. Prices to miscellaneous plate buyers are 2.05c to 2.15c, Chicago.

New York, April 9.—Plate deliveries are further extended. A pipe line at New Britain, Conn., is expected to require about 5000 to 6000 tons of plates. Although bids were taken only on cast pipe by Albany, N. Y., recently it is considered likely that the Albany project will come up again for bids and tenders on fabricated plate pipe will be received. This job is ex-

pected to require about 14,000 tons of steel plates. Bethlehem Steel Co. will supply the plates for two pipe lines placed recently by the New York board of water supply, one in the borough of Queens and one in Manhattan. Together they will take about 4400 tons. Eastern mills shared in some of the plate tonnage closed during the past week by the Erie railroad. Standard Transportation Co., subsidiary of the Standard Oil Co. of New Jersey, has placed an order with the Staten Island Shipbuilding Co. for two tugboats taking about 200 tons of steel each, mainly plates. Plates are firm at 2.05c to 2.15c, base, Coatesville, or 1.95c to 2.05c base, Pittsburgh, depending on which center takes the lowest freight rate to destination.

Philadelphia, April 9.—Plate demand is well maintained and mills on the average now have several weeks' business accumulated. Some have difficulty keeping customers supplied. With a few exceptions, the market minimum now is 2.05c, Coatesville, with small lots bringing up to 2.15c, eastern mill. Mills are operating at 85 to 90 per cent.

CONTRACTS PLACED

693 tons, gas holder, Sinclair Refining Co., Houston, Tex., to Stacey Mfg. Co.
449 tons, 10 tanks, Tidewater Oil Co., Bayonne, N. J., to Hammond Iron Works.

Compulsory Arbitration Opposed by Green

Washington, April 9.—Proposal of the American Bar association to make arbitration agreements between employers and employes legal and enforceable in the courts was condemned by William Green, president, American Federation of Labor. He declared that if such a law were enacted by congress it would legalize company unions and shop representation plans.

"Labor has always contended that it wished to be free from legal entanglements and from participating in legal controversies," he said. "We are committed to the policy of voluntary agreements and voluntary action."

Case May End April 20

New York, April 9.—Hearings in the arbitration proceeding in the complaint of E. Arthur Tutein Inc., Boston, against the Hudson Valley Coke & Products Corp., Troy, N. Y., involving an alleged breach of contract for the sale of pig iron and coke, are expected to terminate April 20. Recent witnesses who have testified for the defunct company are James A. Burden Jr., chairman, Hudson Valley Coke & Products Corp.; Henry Oliver, president, Hudson Valley company and of the Oliver & Snyder Steel Co.; Herman Bernhardt, assistant secretary and treasurer, Hudson Valley company; Henry Deutschbein, president, Foundation Co., and C. L. Chandler, of Lybrand Ross Bros. & Montgomery, New York.

Pipe

145,000-Ton Line Placed—Cast Pipe More Active—Action on Large Lots Still Deferred

DIVIDED among three makers, the largest line pipe order of the year, 145,000 tons, was placed by the Mississippi River Fuel Corp. Several cast pipe orders in the 100 to 1500-ton range were awarded but many are coming along, involving 100 to 30,000 tons at a time. Permission is sought to install 150 miles of 8-inch pipe in 12 Illinois counties. Prices are firm.

PIPE PRICES, PAGE 1012

Pittsburgh, April 9.—Mississippi River Fuel Corp. has awarded 145,000 tons of 22-inch pipe for a 554-mile gas line from Monroe, La., to St. Louis. The order was divided among three makers, 325 miles going to A. O. Smith Corp., 204 National Tube Co., and 25 miles to Spang, Chalfant & Co.

A slight seasonal expansion in demand for buttweld pipe is partly offset by slow buying of lapweld material for the oil country. Seamless material for that field also is slightly less active.

Boston, April 9.—Annual contract for about 1000 tons of various sizes of pipe at Framingham, Mass., was awarded yesterday to the Warren Foundry & Pipe Co. Methuen, Mass., awarded 100 tons of 6-inch pipe to the United States Cast Iron Pipe & Foundry Co. Bids were opened at Fitchburgh, Mass., April 8 on 100 tons of 4 to 12-inch pipe. Concessions still are made on 12-inch and larger pipe.

Chicago, April 9.—Distributors of iron pressure pipe in the north central markets report the outlook good despite a lack of definite projects at this time. Small jobs pending including 985 tons of 12-inch pipe for Chicago, 800 tons of 6 and 8-inch pipe for Flint, Mich, 350 tons of 6 to 12-inch pipe for Whitefish Bay, Wis., and a number of smaller jobs in Illinois, Wisconsin and Michigan. No action was taken on 14,000 tons of 16 to 36-inch pipe for Detroit. Public utility companies in the Chicago area bought about 1000 tons more of castiron pipe during the week. Carload prices are steady at $45.20 to $46.20, delivered, Chicago.

It is understood that $10,000,000 has been made available to the Chicago waterworks department through the sale of tax anticipation warrants for programs this year, which will include the Chicago avenue water tunnel and several other large projects.

Authority to lay approximately 150 miles of 8-inch pipe line in 12 counties in Illinois has been requested of the Illinois commerce commission by Texas Empire Pipe Line Co.

New York, April 9.—Aside from approximately 30,000 tons of 48-inch pipe for Albany, on which action is expected any time, few large projects are noted in the eastern cast pipe market. This situation is being reflected in easier prices. The United Gas Improvement Corp., Philadelphia, recently reported as placing a portion of a substantial cast pipe tonnage with foreign makers, has placed all business this year with domestic shops, including the McWane Cast Iron Pipe Co., United States Cast Iron Pipe & Foundry Co., Donaldson Iron Co., and others.

Cleveland, April 9.—Buttweld pipe continues to move fairly well. Jobbers' turnover in some cases is not as heavy as a year ago. Lapweld pipe, especially in the larger sizes, is quiet, projected lines not nearing maturity as rapidly as anticipated. The heaviest demand at present seems to be for ¾, 1 or 2-inch galvanized pipe. Prices are firm.

Birmingham, Ala., April 9.—Weekly lettings of cast iron pressure pipe aggregate fairly high. The market, however, is termed slow with capacities for manufacture considerably increased. Much pipe is on shop yards but shipments are showing improvement as weather conditions become favorable for installation. Quotations continue $37 to $38 on 6-inch and over sizes.

CONTRACTS PLACED

CAST PIPE

1200 tons, 6, 8, 12 and 16-inch centrifugal pipe for St. Paul, to United States Cast Iron Pipe & Foundry Co.
1000 tons, Framingham, Mass., annual contract, various sizes, to Warren Foundry & Pipe Co.
325 tons, 4 to 18-inch class 100 and 250, San Bernardino, Calif. Allocated as follows: 50 tons 18-inch to United States Cast Iron Pipe & Foundry Co., and 275 tons 4 and 8-inch to Pacific States Cast Iron Pipe Co.
200 tons, odd sizes of cast iron pipe and fittings for De Kalb, Ill., sewage treatment works, pipe being purchased through Union Construction Co.
100 tons, approximately, cast pipe for Bloomfield, N. J., to R. D. Wood & Co., with a small lot of 6 and 12-inch pipe for Montclair, N. J., placed with the same maker.
100 tons, Methuen, Mass., 6-inch pipe, awarded to U. S. Cast Iron Pipe Co.

STEEL PIPE

145,000 tons, 554-mile, 22-inch gas line from Monroe, La., to St. Louis, for Mississippi River Fuel Corp.; 325 miles to A. O. Smith Corp., 204 miles to National Tube Co., 25 miles to Spang, Chalfant & Co.

CONTRACTS PENDING

CAST PIPE

800 tons, 6 and 8-inch pipe for Flint, Mich.; new bids to be asked, former bids having

been rejected.
500 tons, 6 and 20-inch cast pipe for department of water supply, New York, Riverdale Construction Co. awarded general contract.
350 tons, 6, 8 and 12-inch pipe for Whitefish Bay, Wis.; bids in.
144 tons, cast pipe, for department of water supply, New York, bids to be opened April 10.

STEEL PIPE

667 tons, 4 to 12-inch class B, improvement Tweedy Park section, South Gate, Calif., to George H. Oswald, general contractor.
404 tons, 6 to 8-inch class B, Sacramento, Calif. Bids rejected and reopened April 4.
150 miles of 8-inch pipe line in 12 Illinois counties, Texas Empire Pipe Line Co. Authority for laying requested from Illinois commerce commission.
100 tons, 4 to 12-inch pipe, Fitchburg, Mass. Bids opened April 8.

Tin Plate

Buying Shows Improvement—Operations Close to 95 Per Cent

TIN PLATE PRICES, PAGE 1012

Pittsburgh, April 9.—Tin plate shipments and specifications continue active. Leading consumers, including canmakers, have placed larger tonnage so far this year than a year ago. Recent specifications have served to boost operations slightly and the average for the district now is close to 95 per cent. Some consumers have specified their first half requirements in full and buying by canmakers indicates heavy production for the first half. Improved buying also is noted from other large consuming lines. Tin plate continues $5.35 per 100-pound base box, Pittsburgh.

Steel Imports Fair

Philadelphia, April 9.—Steel imports at this port during the week ended April 6 included 53 tons of iron bars from Belgium, 39 tons steel bars from Belgium, 91 tons steel bars from Germany, 178 tons of steel bands from Germany, 89 tons of steel bands from Belgium, 279 tons of structural shapes from Germany, 79 tons structural shapes from Belgium, and 10 tons of galvanized strip steel from the United Kingdom.

Chicago Holds 98 Rate

Chicago, April 9.—Operating virtually at capacity, steelworks in this district are holding to the rated 98 per cent capacity. Indications are that if open-hearth furnaces hold up, operations should continue at this rate at least throughout April. Operations a year ago for the Chicago district were 93 to 95 per cent, with the same number of steelworks furnaces active. Of the 36 steelworks furnaces in the district 29 are blowing. Sheet mill operations are held down to about 85 per cent by lack of semifinished material.

The treasury department has announced allowance of drawback on cast iron pipe and fittings manufactured by the Florence Pipe Foundry & Machine Co., Florence, N. J., with the imported pig iron.

Sheets

Continuance of Present High Rate of Operations Indicated for Second Quarter in Pittsburgh

BACKLOGS on sheet mill order books in the Pittsburgh district and the prospective daily inflow of new business are sufficient to maintain the present rate of operations through second quarter. New business is moderating, following recent heavy contracting. Specifications from the automotive industry show no contraction. The new prices are more firmly established.

SHEET PRICES, PAGE 1011

Pittsburgh, April 9.—Sheet producers are operating with heavy backlogs. On the basis of business now on the books and the general run of day-to-day orders they are in position to maintain the present rate of operations through the second quarter. The heavy tonnage placed during the latter part of the first quarter has served to restrict new business recently, but a good volume of specifications is being received and shipments are holding to a high rate. Little evidence is noted in the rate of buying by automotive interests that current operations in that industry will be restricted during the ensuing month. Deliveries of autobody sheets still are extended six weeks and shipments on other grades have not improved, despite capacity operations. Sheetmakers report the most encouraging feature in the market recently is the firmer stand taken by most producers on new prices, which represent an advance of $2 a ton on black, galvanized and blue annealed over first quarter levels. An increasing volume of business has been placed at the new prices of 2.95c, Pittsburgh, on sheet mill black, 3.70c for galvanized, and 2.20c for blue annealed. Tin mill black continues 3.00c and autobody at 4.10c. Mills are pushing production and total output is close to 100 per cent of theoretical plant capacity, although some mills find it impossible to run all of their mills at this rate due to necessary repairs.

Philadelphia, April 9.—While sheet consumption continues heavy users generally are filling their requirements with receipts on first quarter contracts, and so far there has been no real test of new prices.

Youngstown, O., April 9.—Thunder storms Thursday night flooded service sewers, thus interfering with works operations. Workmen were unable to withstand the excessive heat in the sheet mills. The bessemer plant of the Republic Iron & Steel Co. was off Saturday due to water seepage from the flooded Mahoning river, the Mahoning Valley was off a day due to wet motor, and the warehouse of the General Fireproofing Co. along Crab creek sustained some stock damage. Resumption of all works yesterday found mill managers scrambling to make up for lost production. Specifications continue to roll into mills. Endeavors of new customers to get on mill books some time in June for quick delivery is being discouraged by makers. New auto models coming out in July are expected to take up such slack in demand as may develop with others about that period. Orders for steel barrel stock are incerasing. Quotations are firm at 2.95c, Pittsburgh, for common black, 3.70c for galvanized, which is being taken only in restricted lots, 2.20c for blue annealed, which continues in heavy demand, and 4.10c for autobody.

Cleveland, April 9.—While a little of the extreme pressure for sheet deliveries is being removed, the majority of fabricators want all the material they can get promptly. In most cases all May output is already specified and some specifications run well into June. Some tonnage in ordinary finishes is available in three to five weeks. Many consuming lines are represented in each week's buying. Prices are firm except where continuous mill operators offer blue annealed at slight concessions or where certain galvanizers cut the market by $1 or $2 per ton.

Chicago, April 9.—Second quarter contracting for steel sheets is nearly completed. Mill orders are being entered for second quarter commitments. Deliveries are being lengthened to as much as six weeks on all grades. One sheet mill unit continues to hold to the five-day weekly schedule and sees no immediate prospects for full time operations because of the scarcity in semifinished steel. Buyers are tending to anticipate their requirements further in view of the tightening deliveries. Quotations are on a one-price basis. Chicago delivered prices are 3.10c for No. 24 black, 3.85c for No. 24 galvanized, 2.35c for No. 10 blue annealed. Gary and Indiana Harbor mill prices are $1 a ton lower.

St. Louis, April 9.—The sheet situation continues satisfactory, new business and specifications since the first of this month, maintaining the average of March. Prices remain firm.

Buffalo at Top Pace

Buffalo, April 9.—Operation of larger steelworks of the district is as close to normal 6-day capacity as the various units can be operated. A large producer here believes he could market double the volume of steel his plant can produce in the next 60 days. Open-hearth operations are holding close to 90 per cent.

Structural Shapes

April Shape Orders to Exceed March, the Largest Month Since July, 1928—Government Awards 17,000 Tons at Washington

APRIL lettings in structural shapes will probably outdistance March, which averaged a little less than 50,000 tons weekly as against 31,000 tons, the March, 1928, weekly average in Iron Trade Review's own compilations. This week's awrds total in excess of 80,000 tons, including a 17,000-ton building at Washington, a 12,000-ton subway job at New York and about a dozen other jobs involving 1000 to 7000 tons at a time. The active pending list contains such items as 35,000 tons of subway work and numerous buildings in the 1000 to 10,000-ton class. Mills report that specifications are growing more numerous daily at the new prices for second quarter. Chicago mills have much car work on hand and need as much as seven weeks time to make certain shape deliveries.

STRUCTURAL SHAPE PRICES, PAGE 1011

New York, April 9.—The recent sharp improvement in structural activity in this district is reflected by figures of the structural steel board of trade for March, as just issued. Building work in the Metropolitan district, exclusive of bridges, piers and subway, took 61,256 tons or substantially more than twice as much as were placed in either of the preceding two months of this year. It was the largest monthly total since July of last year when around 70,000 tons was reported.

Eastern shape mills are operating at a high rate, with indications for production in April being even larger than for March, which was a record month for some mills. Action on a 35,000-ton subway job and on the 22,500-ton section of the Westside elevated roadwork is expected shortly.

The market continues strong with the general run on shape business now going at 2.195c to 2.245c, New York.

Boston, April 9.—Less than 1000 tons of structural shapes was placed in this district in the past week. Palmer Steel Co. was awarded 100 tons for a new bank building at Greenfield, Mass., while the Boston & Maine railroad placed 325 tons for three new bridges with the Boston Bridge Co. Haarmann Steel Co. was awarded 480 tons to go into a new building for the Republican Publishing Co., Springfield, Mass.

Philadelphia, April 9.—The shape market has firmed up considerably and indications are that fully 80 per cent of individual consumers now pay 2.05c, base, eastern mill.

Pittsburgh, April 9.—Shape specifications hold to about the rate of a month ago. New business in this district is slow to expand. The Pittsburgh & West Virginia railroad let four bridges, however, taking 5660 tons and the Duquesne Light Co. awarded a 4200-ton power station. Fabricators are figuring on a fair volume of work and are optimistic regarding the future but note a slowness in seasonal expansion for building requirements. Plain material is well maintained at 1.95c, Pittsburgh, on new business.

Cleveland, April 9.—Formal award of 7000 tons for the Midland bank here to American Bridge Co. was made late last week. The H. K. Ferguson Co., general contractor, has bought 3000 tons for the Baltimore plant of the Western Electric Co. from McClintic-Marshall Co., and 1000 tons for the china plant at Newell, W. Va., for the Homer-Laughlin China Co., from the Fort Pitt Bridge Works. Jobs involving less than 100 tons at a time are in sufficient number to keep a few of the smaller fabricators running 100 per cent. Mills report that specifications were heavy in closing out first quarter contracts and already specifications on the 1.95c, Pittsburgh, basis have started to come in.

Chicago, April 9.—Building awards are quiet but specifications for light and heavy plain material are gaining from industrial sources. Car shop requirements have been growing steadily. Plain material deliveries have been advanced further with extensions to as much as seven weeks in some sizes and sections. Operating capacity is more fully engaged than a week ago. The price is 2.05c to 2.15c, Chicago, with quantity differentials.

CONTRACTS PLACED

17,000 tons, United States department of commerce building, Washington, to American Bridge Co., through Consolidated Engineering Co.

12,000 tons, subway sections 1 and 2, route 120, Brooklyn, N. Y., awarded through the Carlton Construction Co. to American Bridge Co.

7000 tons, building, Midland bank, Cleveland, Cleveland Union Terminals Co., to American Bridge Co.

4200 tons, power station, Duquesne Light Co., Pittsburgh, to American Bridge Co., through Byllesby Engineering & Management Corp., Chicago.

4000 tons, two Beaux Arts apartments, at 405 and 406 East Forty-fourth street, respectively, New York, awarded through George A. Fuller Co., general contractor, to McClintic-Marshall Co.

3600 tons, three bridges, Pittsburgh & West Virginia railroad, Connellsville, Pa., to American Bridge Co.

3000 tons, cable plant, Western Electric Co., Baltimore, to McClintic-Marshall Co., through H. K. Ferguson Co., Cleveland.

2060 tons, bridge, Pittsburgh & West Virginia railway, Connellsville, Pa., to McClintic-Marshall Co.

2000 tons Pigeon creek viaduct, Pigeon, Forest county, Pa., to McClintic-Marshall Co.

1835 tons, bridge, Pennsylvania railroad, Gnadenhuten, O., to McClintic-Marshall Co.

1500 tons, plant addition, National Cash Register Co., Dayton, O., to Dayton Structural Steel Co.

1500 tons, theater, Hollywood boulevard, Los Angeles, to McClintic-Marshall Co.

1040 tons, New York state museum, New York, to Hinkle Iron Co.

1000 tons, building, Homer-Laughlin China Co., Newell, W. Va., to Fort Pitt Bridge Works.

850 tons, West Ferry apartment, Buffalo, to Macomber Steel Co. Fabrication to Pittsburgh Bridge & Iron Co.; erection to Sweet Structural Steel Co., Buffalo.

850 tons, store building, Marshall Field & Co., Evanston, Ill., to Midland Structural Steel Co.

750 tons, extension to plant building, Inland Steel Co., Indiana Harbor, Ind., to McClintic-Marshall Co.

700 tons, Virginia state highway bridge, to Dewey Bros.

700 tons, addition to school 102, New York, to Harris Structural Steel Co.

675 tons, substation, Detroit Edison Co., Detroit to McClintic-Marshall Co.

600 tons, highway bridges, Choctaw county, Oklahoma, through Altman-Rodgers Co., to Virginia Bridge & Iron Co.

600 tons, power house for the Atwater Kent Mfg. Co., Philadelphia, to Shoemaker Bridge Co.

525 tons, Community Market building, Toronto, Ont. (425 tons) and store at Toronto (100 tons) to John T. Hepburn Ltd.

500 tons, Brown-Williamson Tobacco factory, Louisville, Ky., to Louisville Bridge & Iron Co.

500 tons, trolley poles for Pennsylvania railroad, to Shoemaker Bridge Co.

500 tons, exchange building, Michigan Bell Telephone Co., Detroit, to Whitehead & Kales Co.

480 tons, Springfield, Mass., building, Republican Publishing Co., Springfield, Mass., to Haarmann Steel Co.

440 tons, apartment 68, Ransom street, Brooklyn, to Hinkle Iron Co.

420 tons, Long Island railroad bridges, to Shoemaker Bridge Co.

382 tons, Salt City building, Hutchinson, Kans., through J. H. Shears & Sons, to unstated interest.

375 tons, extension to building, Aluminum Co. of America, Alcoa, Tenn., to Converse Bridge & Steel Co.

350 tons, bank building, Merchants Bank & Trust Co., Jackson, Miss., to Virginia Bridge & Iron Co.

330 tons, building, Sparks-Withington Co., Jackson, Mich., to Whitehead & Kales Co.

330 tons, bridge over Puyallup river, Tacoma, Wash., to Isaacson Iron Works.

325 tons, two bridges for state of New York, to Bethlehem Steel Corp.

325 tons, three bridges, Boston & Maine railroad, to Boston Bridge Co.

300 tons, bridges, South Greensburg, Pa., to Fort Pitt Bridge Works.

275 tons, addition, General Baking Co., Rosewood street, New York, to unstated interest.

Awards Compared

	Tons
Awards this week	80,331
Awards last week	44,717
Awards two weeks ago	59,635
Awards this week in 1928	32,862
Average weekly awards, March	49,265
Average weekly awards, 1928	39,082
Average weekly awards, 1929	41,564
Total awards to date, 1928	605,772
Total awards to date, 1928	623,465

through Frank O'Hare Co.
270 tons, new deck for Walnut street bridge, Philadelphia, to Bethlehem Steel Bridge Co.
260 tons, cotton drying building, Carney's Point, N. J., through DuPont Engineering Co., to Belmont Iron Works.
260 tons, additional bridges, Southern Pacific railroad, to Virginia Bridge & Iron Co.
255 tons, Market street garage, Lockport, N. Y., to McClintic-Marshall Co.
250 tons, building, Sisters of Mercy, Cincinnati, to L. Schreiber & Sons Co.
250 tons, Shane & Regor store and office building, Los Angeles, to Consolidated Steel Corp.
250 tons, warehouse addition, United States Steel Products Co., Los Angeles, to Consolidated Steel Corp.
250 tons, bank, State Guaranty Corp., San Diego, Calif.. to National Iron Works.
250 tons, school, Glassboro, N. J., to American Steel Engineering. Included erroneously last week in concrete bar awards.
240 tons, Texas state highway bridges, to Virginia Bridge & Iron Co.
218 tons, Gregg street viaduct, Big Spring, Tex., through Crocker & Fisher, to unstated interest.
207 tons, bridge G-13, Deal Lake, N. J., to American Bridge Co.
200 tons, building for Sunbury Converting Works, Belvidere, N. J., to McClintic-Marshall Co.
192 tons, Upjohn building, Seventh avenue and Bedford street, New York, to unstated interest.
180 tons, home for aged, Amtserdam avenue, New York, to Post & McCord.
175 tons, woman's college building, Montgomery, Ala., to Nashville Bridge Co.
170 tons, airplane hangar for Miami, Fla., to Virginia Bridge & Iron Co.
165 tons, Merchants Exchange building, Seattle, to Isaacson Iron Works.
150 tons, airport development, Bristol, N. J., to Belmont Iron Works.
150 tons, warehouse, M. R. Kohler, Frackville, Pa., to unstated interest.
150 tons, high school at Sharon, Pa., to Niles Forge & Mfg. Co.
150 tons. office building, Third and Santa Monica boulevard, Santa Monica, Calif., to McClintic-Marshall Co.
150 tons, highway bridges, 80 tons, Harper county, Oklahoma, through Fisher Construction Co., and 70 tons, Chesterfield county, S. C., through Atlantic Bridge Co., to Virginia Bridge & Iron Co.
150 tons, addition, Steel Co. of Canada Ltd., to Hamilton Bridge Co.
150 tons, building, Rochelle Canneries Co., DeKalb, Ill., to Mississippi Valley Structural Steel Co.
135 tons, north shore airport building near Glencoe, Ill., to Wendnagel & Co.
133 tons, building, Pines Winterfront Co., Chicago, to Hansell, Elcock Co.
125 tons, Emsco airplane factory, Los Angeles, to Consolidated Steel Corp.
113 tons, bank building, Greenfield, Mass., to Palmer Steel Co.
110 tons, store and office building, Sixty-ninth and Ludlow streets, Philadelphia, to Henry A. Hitner's Sons.
106 tons, Luken airport factory, Cincinnati, to General Iron Works.
100 tons, signal bridge, Amsterdam, N. Y., to unstated interest.
100 tons, warehouse. berth 217. San Pedro, Calif., to Consolidated Steel Corp.
100 tons, hangar at Glendale, Calif., to Pacific Iron & Steel Co.
100 tons, garage, Ford, Ont., to Canadian Bridge Co.
100 tons, alterations to residence of Cyrus H. McCormick, 24 Burton place, Chicago, to Wendnagel & Co.
100 tons, rectory building, Holy Name cathedral, Chicago, to Hansell-Elcock Co.
100 tons, steel runway, Crane Co., Chicago, to Vierling Steel Works.

CONTRACTS PENDING

22,500 tons, first section of Westside elevated roadway between Canal and Twenty-second streets, New York, H. B. Greene Contracting Co., 26 Cortlandt street, low on general contract.
6500 tons, 30-story building, Newark and Essex bank, Newark, N. J.; Starrett Bros., New York, to issue specifications shortly.
6000 tons, catenary bridges, Pennsylvania railroad electrification, Philadelphia to Trenton, N. J. Bids open April 15.
5000 tons (approximately), 10-story warehouse, New York Central, 851 Morris avenue, New York.
4500 tons, plant, Newton Steel Co., Monroe, Mich. Action expected April 10.
2800 tons, office building, Lexington avenue and Forty-first street, New York.
2530 tons, assembly plant, Long Beach, Los Angeles, Ford Motor Co., Detroit. Bids closed Feb. 20.
2000 tons, Federal Reserve building, Los Angeles. Bids being received.
2000 tons, first section Plaza subway, Philadelphia. Golder Construction Co. low bidder.
2000 tons, department store, May Co., Los Angeles Bids being received
1900 tons, cable plant, Western Electric Co., Baltimore; bids in.
1500 tons, Medical Arts building, Birmingham, Ala.
1350 tons, Susquehanna river bridge.
1200 tons, Loew theater, 175th street and Broadway, New York.
1000 tons, Laboratory extension, Rockefeller institute, New York.
1000 tons, power plant at Ponca City, Okla.
800 tons, unit 10, for Fred F. French, Tutor City development, Forty-second street and East river, New York.
620 tons, nurses' home Evanston, Ill.
600 tons, building for Sheffield farms, Bronx, New York.
500 tons, hospital, Hill and Sunset boulevard, Los Angeles. Bids received.
444 tons, warehouse, Port commission, Oakland, Calif. Pacific Coast Engineering Co. low bidder.
400 tons, repair shop for Chicago, Rock Island & Pacific railroad, at El Reno, Okla.
400 tons, alterations to Pennsylvania railroad station, New York.
250 tons, telephone building, Yakima, Wash. Bids April 9.
250 tons, building, Chicago City Bank & Trust Co., Sixty-third and Halsted streets, Chicago; A. Epstein, architect.
200 tons, New York state highway bridges.
182 tons, apartment, Pacific and Laguna streets, San Francisco. Schrader Iron Works low bidder.
150 tons, building, Scott-Fetzer Co. Cleveland. Bids in. General contract let to H. E. Kleffman Co.

Concrete Bars

Open Weather Brings Out Inquiries—Sales More Numerous

ACTIVITY is more pronounced in connection with concrete bar projects. Sales are more numerous and inquiries possess more snap and vigor. Bids in the Cleveland-Chicago territories still evidence lack of price strength but quotations seem to be holding in other sections. Three apartments are up in Chicago, taking 200, 570 and 850 tons, respectively.

REINFORCING BAR PRICES, PAGE 1011

Chicago, April 9.—More building work is approaching the active stage in the reinforcing bar market than at any time this year. Bar prices still are unsteady, and bids recently submitted indicate further shading in price. Billet bar quotations are 2.35c to 2.40c, and rail steel bars are moving in a range of 2.00c to 2.05c.

March building permits in Chicago showed an increase of 411 units, and 135 per cent in value over February, but decreased 288 units and 42 per cent in value from permits in March, 1928.

Pittsburgh, April 9.—New concrete reinforcing jobs are increasing. Although awards are confined to small tonnages a fairly large number of such projects are being closed. Mills are well engaged on business booked a short time ago and prospects are promising for further letting. The market is 2.25c to 2.30c, Pittsburgh, for cut lengths and 2.00c to 2.05c for stock lengths of billet bars.

Boston, April 9.—Last week a slight falling off in orders for concrete bars was noted. About 400 tons in all was let. Of this amount, 225 tons represented work for the Dorchester Rapid Transit Co. of Boston, awarded Concrete Steel Co.

Buffalo, April 9.—Demand for reinforcing bars is better, although big orders long pending are rather slow in coming to the mills. Small lots move brisky at 2.515c, Buffalo warehouses. Production is at the high point of the year in reinforcing bar departments. Two 100-ton lots for road work are listed among new inquiries this week. Several other good sized tonnages will be added to pending inquiry shortly.

Cleveland, April 9.—Recent concrete bar awards have all been small. The Ohio Bell Telephone Co.'s Broadway exchange building, 120 tons, went to Paterson-Leitch Co., and the Standard Envelope Co.'s building, less than 100 tons, went to the Bourne-Fuller Co. Pending work includes a 100-ton job for the Widlar Co., Cleveland; 140-ton culvert extension job at Whithouse crossing, Garfield Heights; and a 125-ton bridge over East Seventy-fifth street.

Awards Compared

	Tons
Awards this week	7,365
Awards last week	6,823
Awards two weeks ago	6,500
Awards this week in 1928	6,438
Average weekly awards, March	6,832
Average weekly awards, 1928	6,189
Average weekly awards, 1T29	6,455
Total awards to date, 1928	103,138
Total awards to date, 1929	96.818

CONTRACTS PLACED

2300 tons, United States department of commerce building, Washington, to Truscon Steel Co.
350 tons for public school, Jersey City, N. J., to Kalman Steel Co., through D'Elia Contracting Co.
350 tons, Bellingham Community hotel, Belling-

ham, Wash., to Northwest Steel Rolling Mills.
350 tons, work for Chicago & North Western railroad, to several fabricators.
335 tons, grade crossing elimination work, Long Island railroad, Bayshore, N. Y., to Milton Mfg. Co.
300 tons, store, Philadelphia, Sears, Roebuck & Co., Chicago, to Concrete Steel Co.
300 tons, store, Washington, Sears, Roebuck & Co., Chicago, to Edward T. Edwards.
266 tons, plant for Illinois Publishing Co., West Twenty-sixth and LaSalle streets, Chicago, to Calumet Steel Co.
250 tons, building, Pine street, New York, to Truscon Steel Co.
230 tons, sewage disposal plant, Rockville Center, N. Y., to Truscon Steel Co., through Joseph Sigretta, New York.
225 tons, work for Dorchester Rapid Transit Co., Boston, to Concrete Steel Co.
200 tons, apartments Hyde Park boulevard and Cornell avenue, Chicago, to Inland Steel Co.
185 tons, West Spokane street bridge, Seattle, to Pacific Coast Steel Co. Listed April 4 as 100 tons.
175 tons, apartment, 512 South Hobart street, Los Angeles, to unstated company.
155 tons, store building, West Division street, Chicago, to Inland Steel Co.
150 tons, apartment, 915 South Wilton place, Los Angeles, to unstated company.
130 tons, store, Broadway and Pine streets, Long Beach, Calif., to unstated company.
131 tons, Consolidated dairy, Seattle, to Pacific Coast Steel Co.
125 tons, Abraham Lincoln hotel, Reading, Pa., to Hausman Co.
120 tons, Broadway exchange building, Ohio Bell Telephone Co., Cleveland, to Paterson-Leitch Co.
120 tons for subway station, Brooklyn, N. Y., to Capitol Steel Co., through Carlo Petrillo.
118 tons, cannery, Booth Co., Pittsburg, Calif., to Soule Steel Co.
100 tons, state highway work, North Carolina, to Connors Steel Co.
100 tons, apartment, 511 Belmont avenue, Chicago, to Barton Steel Co.
100 tons, Aldine avenue apartment building, Chicago, to Concrete Engineering Co.
100 tons, work for Chicago, Milwaukee, St. Paul & Pacific railroad at Tomah, Wis., to American System of Reinforcing.
100 tons, including addition, Standard Envelope Co., Cleveland, to Bourne-Fuller Co.
100 tons for Wanaque pipe line, Newark, N. J., to Joseph T. Ryerson & Son Inc.

CONTRACTS PENDING

850 tons, apartment, Fiftieth street and Lake Michigan, Chicago; Leo B. Steiff, architect.
570 tons, apartment, 4924 Cornell avenue, Chicago; Walter G. McNulty & Bro. contractor.
490 tons, school, San Francisco. Bids received.
400 tons, Puyallup River bridge, Tacoma, Wash. Bids received.
200 tons, apartment, 5000 Cornell avenue, Chicago; Walter G. McNulty & Bro., contractor.
150 tons, bridge, East Seventy-fifth street, Cleveland. Bids in.
140 tons, Henry street culvert extension, Whitehouse crossing, Garfield Heights, Cleveland. General contract to Peter Joy & Co.
100 tons, (mesh), Hinman road, Lockport, N. Y. Bids April 17.
100 tons, (mesh), Upper Mountain road, Lockport, N. Y. Bids April 17.
100 tons, building, Widlar Co., Cleveland. Bids in.
Unstated tonnage, substation for Commonwealth Edison Co., 10 East Lake street, Chicago.
Unstated tonnage, store and office building for Klee Bros. & Co., Milwaukee and Cicero avenues, Chicago; A. Epstein, architect.

Standard Is Reaffirmed

Washington, April 9.—The simplified practice division, department of commerce, has announced that simplified practice recommendation No. 79, malleable foundry refractories, has been reaffirmed by the industry for another year, without change.

A survey conducted within the industry showed that production was 64.31 per cent in conformity with the simplification. This program as originally developed in February, 1928, reduced the varieties of the commodity from 188 to 15.

Rails, Cars

Erie Buys 2530 Cars—Baltimore & Ohio Wants 3000—Secondary Rail Orders Mount

ERIE railroad's award of 2530 tops the week's car activity, involving more than 4200 cars. About 7500 now are pending, including 3000 for Baltimore & Ohio. Chicago & North Western's 2500 box cars are to be placed within two weeks. Secondary rail tonnage is expanding. Accessory orders are well maintained. Chicago, Rock Island & Pacific wants 30 locomotives.

RAILROAD TRACK PRICES, PAGE 1012

New York, April 9.—Erie railroad has placed 2500 steel freight and 30 suburban cars and the Baltimore & Ohio 125 miscellaneous coaches. This latter is the largest coach order placed in this district in some time. Chicago, Rock Island & Pacific wants 30 locomotives.

Approximately 7500 domestic freight cars now are pending. The Southern Pacific withdraws its inquiry for 250 tank cars.

Freight car awards in March totaled 12,023. This brings the total for the first quarter to 41,163 or 3600 less than were awarded during all in 1928. A full comparison follows:

	1929	1928	1927	1926
Jan.	13,196	4,160	14,710	8,830
Feb.	15,944	10,220	5,960	12,895
March	12,023	2,958	4,955	8,895
Total (3 mos.)	41,163	17,338	25,625	30,620
April		6,043	3,675	4,615
May		2,531	5,425	4,448
June		2,422	7,440	4,285
July		582	2,295	1,265
Aug.		677	1,181	152
Sept.		1,378	682	3,335
Oct.		2,853	886	2,840
Nov.		6,140	1,189	3,925
Dec.		4,799	14,897	8,990
Total		44,763	63,295	64,475

Pittsburgh, April 9.—Specifications for track fastenings hold to the improved rate noted a short time ago. Most carriers are fairly well engaged on new track laying and demand for such material is correspondingly heavier. A fair volume of material is being placed for replacement work. Local car builders have a heavy volume of business on books compared with a year ago and one company shared to the extent of 1000 70-ton steel hoppers in the Erie railroad award.

Cleveland, April 9.—An inquiry for 500 tons of rails from a small road in this territory could not be entertained by sellers here because it specified May delivery and leading rail mills are fully scheduled until June. Shipments never were heavier, it is said, and demand for deliveries never was so keen. The Nickel Plate is giving until tomorrow for bids on its four locomotives.

Chicago, April 9.—Secondary rail orders from two railroads placed 15,000 tons of rails on books of western mills. While no definite inquiry is before the market, additional secondary tonnage is taking form. Track fastenings sales amounted to about 4000 tons. Specifications are steady and departments producing track fastenings at capacity are more heavily booked than at any time in a year.

Of 2500 freight and 30 suburban cars ordered by Erie, 530 cars, calling for more than 13,000 tons of bars, plates and shapes, are going to the West. Chicago & North Western's 2500 box cars will probably not be purchased for at least two weeks. Northern Pacific is in the market for 500 automobile and 300 flats and stock cars. Chicago Surface Lines awarded 100 50-horsepower electric cars. Western car shops are steadily increasing their operations.

CAR ORDERS PLACED

Anglo-Chilean Consolidated Nitrate Corp., 100 gondolas to Magor Car Corp.
Baltimore & Ohio, 125 miscellaneous coaches placed, 100 express cars going to Standard Steel Car Co., 50 baggage to Bethlehem Steel Co., and 10 baggage and mail to American Car & Foundry Co. and seven cafe and five diners reported awarded the Pullman Car & Mfg. Corp.
Chicago Surface Lines, 100 50-horsepower electric cars to General Elecrtic Co.
Chicago & North Western, five passenger express cars to the Pullman Car & Mfg. Corp.
Erie, 2530 cars awarded as follows: 1000 hoppers and 30 steel suburban cars, to Standard Steel Car Co., 500 40-ton automobile cars to American Car & Foundry Co., 500 50-ton box to General American Tank Car Corp., 250 30-ton steel gondolas to Greenville Steel Car Co., and 250 70-ton steel gondolas to Bethlehem steel Co.
Houston Colleries Co., 100 mine cars to Western Gas Construction Co.
New York Central, 370 cars as follows: 10 passenger-baggage cars to Pressed Steel Car Co., 10 diners to Pullman Car & Mfg. Corp.; 20 baggage to American Car & Foundry Co.; and 30 express with 300 flats reported placed with shops of Merchants Despatch Transportation Co.
St. Louis-San Francisco, 365 flat bottom coal cars, to its own shops at Yale, Tenn.
Southern Pacific, 20 air dump cars, to Magor Car Corp. and 500 flats to own shops.
Timken Roller Bearing Co., 10 70-ton gondola cars, to American Car & Foundry Co.

CAR ORDERS PENDING

Baltimore & Ohio, 2000 hoppers and 1000 mill type gondolas.
New Cornelia Copper Co., 50 to 75 60-ton steel concentrate cars.
Northern Pacific, 10 baggage and mail cars; these are in addition to five previously noted as pending.
Southern Pacific, 250 tank cars; inquiry withdrawn.
Tennessee Coal, Iron & Railroad Co., 12 freight cars, contemplated.

LOCOMOTIVE ORDERS PENDING

Chicago, Rock Island & Pacific, 30 locomotives.

Wire

Nail Demand Growing Somewhat —Fencing and Automotive Needs Require Large Tonnages

BETTER demand for wire and nails is evident in a number of items. Fencing is being taken in increasing tonnage as the season advances. Second quarter contracting is near its end and specifications are being filed. Manufacturers continue to lead in requirements. As a whole business is running ahead of the rate attained in March. Prices are firm.

WIRE PRICES, PAGE 1012

Chicago, April 9.—Woven fencing sales are making appreciable gains. Demand for wire nails is slowly increasing. Second quarter contracting for wire products is virtually completed and specifications are being received for second quarter tonnage. Orders for manufacturers' wire are active. Western wire mill operations continue at 70 per cent. Quotations for wire products are reported steady on the basis of 2.55c, Chicago or western mills, for bright plain wire, and $2.70 for wire nails to large jobbers.

Pittsburgh, April 9.—Further slight improvement is noted in demand for wire nails and fencing material, in line with improved weather conditions. Nail stocks of most jobbers still are fairly heavy, however. The recent steady pace of specifications for manufacturers' wire prevails and total business in all wire products is running ahead of the March rate. Specifications of automotive interests for wire show no decrease. The market is firm at 2.50c to 2.60c for plain wire and $2.65 to $2.75 for wire nails.

Cleveland, April 9.—Wire nails are improving, both from order and inquiry standpoints. Jobbers are taking more as spring advances and as building opens up. Inquiries are heavier, too, for wire and specifications for all kinds of manufacturers' wire have been exceptionally active. Prices are said to be firmer than at any time in 6 to 12 months.

Cold Finished Steel

Specifications Continue Heavy Despite Large Bookings

COLD FINISHED PRICES, PAGE 1012

Pittsburgh, April 9.—Specifications for cold finished steel are fairly active despite the volume of business placed late in March. Demand from automotive interests is well maintained and farm implement producers and other leading consumers also are taking material in good volume. Cold finished steel bars are firm at 2.30c, Pittsburgh.

Cleveland, April 9.—Cold finished bar needs continue heavy as demonstrated by sustained specifying rates. Tonnage accumulated against first quarter contracts is well used up and specifications now are active against 2.35c, Cleveland, arrangements for second quarter. Deliveries are four to six weeks deferred. Automotive buying leads.

Corp. Directors to Meet

New York, April 9.—A special meeting of directors of the United States Steel Corp. has been called for next Tuesday to discuss rights and other details in connection with the proposal to retire bonds and issue more common stock. Approval of the new financing program is to be asked of stockholders at the annual meeting of the corporation which is to be held next Monday.

Automotive Exports Gain

Washington, April 9.—February exports of American automotive products reached a new peak with a value of $61,529,748, according to the department of commerce. The previous high point was $50,737,063 last October. Over exports of February, 1928, the increase was 68 per cent.

Tractor Export Value Up

Washington, April 9.—Exports of tractors from the United States in 1928, totaling 57,723 units valued at $51,440,149, developed a slight recession from 1927 in units, but a marked increase in value. Canada was again in 1928 the principal buyer of American tractors of all types.

Strip

Heavy Demand Continues—Deliveries Falling Further Behind—Automotive Needs Are Large

HIGH rate of demand for steel strip established in March has not declined and producers find backlogs increasing. Deliveries now are deferred five to eight weeks and no sign is seen of an easier situation. Automotive specifications show no hint of lessening. Anticipation of second quarter needs apparently did not furnish sufficient tonnage for current needs.

STRIP PRICES, PAGE 1012

Pittsburgh, April 9.—Strip steel producers have yet to feel the passing of the peak demand that has prevailed for a number of weeks. Specifications are being received in good volume for both hot and cold-rolled material, indicating that anticipation of second quarter needs during the latter part of first quarter did not fill consumers' requirements far ahead. Delivery on hot strip still is deferred five to eight weeks, with cold-rolled material on a shorter basis. Specifications from the automotive interests show little sign of declining. Prices are well maintained at 2.00c, Pittsburgh, for hot strip to 6 inches, 1.90c for 6 1/16 to 24-inch, and 2.75c to 2.85c for cold-rolled strip.

Philadelphia, April 9.—Strip steel consumption continues heavy, but consumers generally are well supplied from first quarter contracts and new prices have not been tested.

Youngstown, O., April 9.—Specifications for hot and cold-rolled material continue to pour into valley mills, whose capacity operations are limited to rationed supplies of billets in some instances. The new high speed mill of the Sharon Steel Hoop Co., which was started last week, is working satisfactorily but is being run at one turn a day until it is broken in. Hot-rolled strip brings 2.00c, Pittsburgh, for the narrowest widths, and cold-rolled 2.75c to 2.85c, Pittsburgh and Cleveland, for 3 tons or more.

Cleveland, April 9.—Both hot and cold strip demand continues on a high plane. Coils of the former for automotive, agricultural implement, household appliance and other parts represent a large tonnage weekly and deliveries are more extended. Some makers have nothing to offer this side of June. Prices are 1.90c to 2.00c, Pittsburgh, depending upon width, and some makers quote 2.00c to 2.10c, Pittsburgh, where specifications involve less than 5 tons of a size. Cold strip is unchanged at 2.75c to 2.85c, Cleveland-Pittsburgh.

Chicago, April 9.—Deliveries on cold rolled strip steel are backing up to a greater extent than at any time this year. Shipments on some sizes are extended to five or six weeks, although the tonnage comprising considerable of the current backlogs covers material ordered for delivery spread over several weeks. Cold rolled strip is 2.75c to 2.85c, Pittsburgh-Cleveland base.

Nonferrous Metals

Consumers in General Are Well Covered on Future Requirements—Buying at Near-Standstill During Week—Copper Prices Drop

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Apr. 3	24.00	24.10	23.75	48.50	48.50	7.75	7.65	6.80	23.90	9.62½	35.00
Apr. 4	24.00	24.10	23.75	48.12½	48.12½	7.50	7.40	6.80	23.90	9.62½	35.00
Apr. 5	24.00	24.10	23.75	47.95	47.95	7.50	7.40	6.80	23.90	9.62½	35.00
Apr. 8	24.00	24.10	23.75	47.37½	47.37½	7.25	7.10	6.75	23.90	9.62½	35.00
Apr. 9	22.00	22.10	21.75	46.70	46.70	7.25	7.10	6.75	23.90	9.62½	35.00

NEW YORK, April 9.—With users of nonferrous metals well covered on their needs for the next few months, buying has quieted down. In fact, it has been almost at a standstill during the past week. Some recessions have appeared in prices, but for the most part underlying conditions remain strong.

Shipment and consumption of all metals continue far above the averages of the past year and at the highest levels ever reached. Stocks in producers' hands are exceptionally light in proportion to consumption. Only in copper, however, are stocks actually below average. The true situation has been somewhat obscured by the erractic movements of speculative markets such as the New York stock exchange and the London metal exchange.

Brass and copper mill products are well booked for several months ahead and mills are operating about at capacity in most departments. The high price of copper has caused much talk of substitutes, especially in sheet metals.

Copper—Red metal fell off to 22.00c, delivered in the open market on Tuesday as result of effort to move metal in the dull market which had prevailed for about 10 days. Producers generally, however, continue to quote 24-cents but this meant little with custom smelters offering metal at 22.00c, dedivered. Some copper is available at 19.75c, Prices went down with a smash in London on Tuesday. This accompanied action of Copper Exporters Inc. which permitted smelters belonging to it to sell nearby metal abroad at 22.25c, c.i.f. European ports.

Previous to Tuesday, a light tonnage of speculative copper was offered at bargain prices in a market where users were well covered. Some of this metal was taken up by producers. Export buying as well as domestic continues light, but it is believed foreign users still must cover needs for June and July although domestic users are well covered for these months. There is much talk on whether users have overbought, but to date the mills have specified more copper than producers have been able to ship. And mills say their customers appear to need all of the products they have on order, with high pressure for shipments continuing in many lines. On the other hand, mills are bringing pressure on some delinquent customers for specifications.

Lead—Prices have eased off to 7.10c, East St. Louis, following two cuts by the leading interest to 7.25c, New York. Demand has not been very active and most likely for April and May.

Zinc—Quotations are holding unchanged in a dull market.

Tin—Light demand and declining prices in London and this country have characterized the tin market.

Antimony—Quotations have held steady at 9.62½c, duty paid, on spot, throughout the last week.

Aluminum—Good demand and unchanged prices are prevailing.—*Daily Metal Trade.*

Mill Products

Base prices cents per pound f.o.b. mill, except where otherwise specified

SHEETS	
Yellow brass (high)	27.12½
Copper, hot rolled	33.75
Lead, full sheets (cut ¼c more)	10.00
Zinc sheet (100-pound base)	$10.25
Zinc strip (100-pound base)	$9.25
Aluminum, flat sheets, up to 10 gage, 3" to 72" wide	31.30
SEAMLESS TUBE	
Yellow brass (high)	32.00
Copper	35.12½
RODS	
Yellow brass (high, full turnings)	24.87½
Naval brass	27.50
WIRE	
Copper	25.87½
Yellow brass (high)	27.62½

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	13.00 to 13.25
Chicago	15.00 to 15.50
Cleveland	14.00 to 14.25
HEAVY YELLOW BRASS	
Cleveland	11.00 to 11.25
ZINC	
New York	3.50 to 3.75
Cleveland	3.25 to 3.50
HEAVY COPPER AND WIRE	
New York	16.00 to 16.50
Boston	17.00 to 18.00
Chicago	16.50 to 17.50
Cleveland	16.00 to 16.25
RED BRASS BORINGS	
New York	12.00 to 12.25
YELLOW BRASS TUBING	
Cleveland	11.00 to 11.25
LIGHT COPPER	
New York	14.00 to 14.50
Chicago	14.75 to 15.75
Cleveland	15.00 to 15.25
LIGHT BRASS	
Boston	9.00 to 9.50
Chicago	10.00 to 10.50
Cleveland	9.00 to 9.25
ALUMINUM	
Clippings, Cleveland	18.00 to 18.50
Borings, Cleveland	9.50 to 10.00
Cast, Cleveland	12.75 to 13.00
Cast, Boston	10.50 to 11.00

Secondary Metals

Remelt aluminum No. 12	17.00 to 17.50
Brass ingot, 85-5-5-5	22.00 to 22.25

Coke By-Products

Fertilizer Makers Specify Sulphate of Ammonia—Prices Generally Steady

New York, April 9.—Sellers of sulphate of ammonia assert that specifications against long time contracts placed by fertilizer manufacturers have been coming through much better than some expected earlier in the year. These contracts, however, will soon be terminated, following which there will likely be a period of dullness, in the opinion of most distributors. Contracting for next year likely will not get much under way before June, possibly later.

Prices continue unchanged at $2.20, delivered on material for domestic account, and $2.20, port, in double bags, for sulphate for export, although this latter price is little more than nominal. The situation in light oil distillates is largely unchanged, with prices steady and specifications coming out in the same high volume of recent weeks. Most consumers of naphthalene are now fairly well covered on their spring cleaning season requirements. Prices, however, continue steady.

Coke Oven By-Products

Per Gallon at Producers' Plant in Tank Lots

	Spot
Pure Benzol	$0.23
90 per cent benzol	0.23
Toluol	0.40
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17
Per Pound at Producers' Plants	
Naphthalene flakes	0.05½ to 0.06½
Naphthalene balls	0.06½ to 0.07½
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.30

Warehouse

Sustained Industrial Improvement Maintains Call on Jobbers—Mill Deliveries Hampered—Prices Unchanged Except Galvanized Sheets

SALES from warehouses the country over are well maintained, partially due to the sold-up condition of the mills and sustained improvement in industrial conditions generally. Prices are firm as a rule, although in Cleveland, where black and galvanized sheets were recently advanced $2, weakness has developed in galvanized. April tonnage probably will exceed that of March, the proverbially active month of the year.

New York—Recent improvement in iron and steel jobbing demand here is being well maintained. At the present rate, April should exceed March, which for most jobbers in this district was somewhat disappointing in view of the high activity in the iron and steel industry generally. Prices are unchanged, with some of the more important jobbers expecting few revisions over the near future.

Pittsburgh—April sales hold to the active rate of late March. Material for building purposes is in slightly heavier demand. A good call is being received for bars, sheets and cold finished material. Prices on bars and small shapes are unchanged from the 2.90c figure prevailing during the first quarter. Jobbers still are encountering some competition from mills in the latter's bidding on small lots.

Philadelphia—Jobbers report that business continues good. Prices are firm and unchanged.

Cleveland—April buying from warehouses is up to the March rate and in a few instances, exceeds it. Demand applies to everything handled. Sheet shipments are heavy. Prices are well observed. One jobber raised black and galvanized sheets $2 per ton to 3.70c and 4.55c, respectively but others still quote 3.60c and 4.45c. The galvanized sheet price is unclarified, with some 4.35c quotations still available. Blue annealed is unchanged at 3.25c.

Cincinnati—Tonnage in warehouse products increased the last week. Extended mill deliveries have caused the warehouse market to take on a better appearance. Prices remain steady.

St. Louis—The arrival of spring has had a decidedly stimulating effect on building operations and farming activities throughout the South and Southwest. This situation is reflected in an increased demand for iron and steel from warehouses.

Demand for highway construction materials, including repair materials for machinery, is brisk.

Municipal improvements in St. Louis and smaller cities nearby and river improvement work all take large aggregate tonnages.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.75c
Houston	3.00c
Los Angeles	3.30c
New York†††‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.75c
New York††	2.80c to 3.24c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.75c
Cincinnati	3.15c
Cleveland	2.25c to 2.44c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl.	2.65c
Los Angeles lcl.	3.00c
New York	2.90c to 3.30c
Philadelphia	2.75c to 3.10c
Pittsburgh	2.90c to 3.175c
San Francisco cl.	2.00c
San Francisco lcl.	2.25c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡	3.25c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.30c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Phila., 3/16-in.*	2.90c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.45c
Boston ⅜-in.	3.915c
Buffalo	3.50c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.90c
Portland	3.75c
Philadelphia*†	3.25c
Pittsburgh**	3.35c to 3.45c
San Francisco	3.80c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.34c

NO. 24 BLACK SHEETS

Baltimore	3.25c to 4.00c
Boston	4.85c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Cleveland	3.60c to 3.70c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York	3.90c to 4.00c
Philadelphia*†	4.10c
Pittsburgh**	3.85c
Portland	4.90c
San Francisco	4.90c
Seattle	5.00c
St. Louis	4.25c
St. Paul	3.95c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore	4.30c to 4.50c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.65c
Cincinnati	4.75c
Cleveland	4.35c to 4.55c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.30c
Los Angeles	5.30c
New York	4.75c
Philadelphia*†	4.85c
Pittsburgh**	4.85c to 4.95c
Portland	5.50c
San Francisco	5.30c
Seattle	5.50c
St. Louis	5.10c
St. Paul	4.90c
Tulsa	5.10c to 5.35c

BANDS

Baltimore	3.85c
Boston	4.015c to 5.00c
Buffalo	3.65c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c to 3.65c
Detroit, ⅜-in. and lighter	3.30c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	3.75c
Philadelphia*	3.15c
Pittsburgh	3.25c
Portland	4.00c
San Francisco	3.75c
Seattle	4.00c
St. Paul	3.50c
Tulsa	4.50c to 4.69c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	3.75c
Cincinnati	4.05c
Cleveland	3.25c to 3.65c
Detroit, No. 14 and lighter	3.80c
New York‡‡	4.25c
Philadelphia*	3.40c
Pittsburgh	4.25c
Seattle	5.00c
St. Paul	4.00c

COLD FINISHED STEEL

	Rounds, hexagons,	Flats, squares
Baltimore (c)	3.35c	3.85c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.60c	4.10c
Philadelphia*	3.60c	4.00c
Pittsburgh	3.70c	4.20c
Portland (a)	4.50c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.64c	5.14c

(a) Rounds only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pound lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.15c

(b) Net base, straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	13.00c
Iron bars, round	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. ††Domestic bars. **Less than 25 sheets. *†50 or more bundles.

Pacific Coast

Advancing Season Brings Out Heavy Total of Steel—Prices at Stable Level

ACTIVITY in iron and steel along the Pacific coast is increasing as the season grows older and projects now in hand by fabricators and suppliers, with new projects coming out each week make an active situation. Prices are being adjusted between mills and jobbers and cutting has disappeared. Contracts are being well distributed among mills. Several large awards to be made soon.

San Francisco, April 6.—(*By Air Mail*)—Movement of iron and steel products this week was confined mostly to cast iron pipe and shape tonnages, the largest award calling for 1500 tons for a theater in Los Angeles, placed with McClintic-Marshall Co. Merchant bar and structurals continue firm, but little real tonnage has been offered to test the plate price.

Pig Iron and Coke

Sales and inquiries for foundry pig iron and coke were limited to small lots for prompt shipment. No change in prices on pig iron has occurred.

Bars, Plates and Shapes

Awards of concrete bars this week were more numerous, but most lettings called for lots of less than 100 tons. Pending business, which aggregates over 3000 tons, includes 500 tons for a school in San Franciso, bids on which have been opened. Demand for merchant bars continues limited to small lots, usually carloads or less, and composed of numerous sizes. On this class of material 2.35c c.i.f. is firm. Awards of concrete bars so far this year total 21,727 tons, compared with 27,666 tons for the corresponding period in 1928.

Most plate tonnage called for small lots. Awards aggregated 1039 tons and brought the total for the year to 56,871 tons, compared with 10,992 tons for the same period a year ago. No decision has yet been arrived at on the 13,200 tons for the two Matson boats. Prices remain untested at 2.35c c.i.f.

Structural awards this week were the heaviest in over a month and totaled 4049 tons, bringing the aggregate for the year to 58,391 tons as compared with 50,697 tons for the corresponding period in 1928. In addition to the 1500 tons for a theater in Los Angeles, mentioned above, the Consolidated Steel Corp. took 250 tons for an addition to the warehouses of the United States Steel Products Co. in Los Angeles and 100 tons for a warehouse at San Pedro. The Pacific Car & Foundry Co., also placed 1000 tons with various interests. New inquiries include 2000 tons for the Federal Reserve building in Los Angeles, 500 tons for a hospital and 2000 tons for a department store in the same city. It is expected that 444 tons for a warehouse in Oakland for the port commission will be awarded to the Pacific Coast Engineering Co. Prices are firm at 2.35c c.i.f. on plain domestic material.

Other Finished Material

Awards of cast iron pipe this week totaled 1454 tons and brought the aggregate for the year to 33,282 tons, compared with 22,970 tons for the same period a year ago. Southgate, Calif., placed 667 tons on a contractor's letting. The Pacific States Cast Iron Pipe Co. secured 275 tons for San Bernardino, Calif., and the United States Cast Iron Pipe & Foundry Co., 50 tons. Recently the Southern Pacific Co., San Francisco, called for bids on 2242 tons and this week decided to purchase lapweld tubing, which totaled 903 tons. Pending business is limited to two or three large projects, calling for less than 2000 tons.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	24.00 to 25.00

*C.i.f. duty paid.

General Demand Strong

Seattle, April 5.—Demand for iron and steel products is better than normal. Several large projects are pending and lettings of steel contracts during the next 90 days are expected to be heavy.

Steel prices are holding firm. Some items have been advanced at the mills but wholesalers are absorbing the increases. There is less complaint about price cutting and imports of foreign steel are causing little active competition.

Bars, Plates and Shapes

Recent bookings of concrete bars have been small tonnages but the total has served to keep local mills on steady operation. Several large projects are up for figures and will be awarded soon. The heaviest pending tonnage is for the Seattle Merchants Exchange building, nearly 2000 tons. Awards this week included 350 tons to the Northwest Steel Rolling Mills for the Community hotel, Bellingham, and 131 tons to the Pacific Coast Steel Co. for the Consolidated Dairy Co. plant, Seattle.

Contract for furnishing about 100 tons of pipe for the water system at Port Townsend went to James H. Coyne, general contractor. No large tonnages for plates have developed and 2.35c remains the untested mill price. Jobbing houses report a fair volume of business in light gages.

Structural awards this week totaled about 400 tons, two contracts being booked by Isaacson Iron Works, Seattle. These include 330 tons for the Puyallup river bridge at Tacoma, general contract to Paul Savidge, and 165 tons for the Merchants Exchange building, Seattle. Bids will be opened April 9 for a telephone building at Yakima involving 250 tons of shapes. No large tonnages for structurals have developed. Mill prices are steady at 2.35c. Idaho state engineers have drawn plans for a proposed 250-foot steel bridge over the Priest river, to cost $70,000.

Finished Materials

Jobbing houses report sales heavier than a month ago. Sheets are moving slowly but are expected to be in better demand shortly. Other items are being sold in greater tonnages. Mill advances of 0.05c on galvanized and black sheets and 0.12½c on blue annealed have not affected local wholesale prices, jobbers in the meantime absorbing the difference, although an adjustment is being discussed.

Old Materials

Local steel mills are receiving ample supplies of steel scrap, prices unchanged at $10 and $11, gross. Exporters are still actively in the market for desirable tonnages, freight rates being more favorable to Japan. Cast iron scrap continues firm at $14, net, and scarce although foundries are not buying heavily.

March Tractors, Trucks at New Record

Washington, April 9.—Shipments of electric industrial trucks and tractors were the highest in March since the department of commerce began recording statistics. Monthly comparisons follow:

	Domestic Tractors	All other Types	Exports
1928			
January	5	98	9
February	15	86	18
March	18	95	16
(3 mos.)	38	279	43
April	9	121	6
May	8	93	13
June	6	96	14
July	5	87	15
August	5	85	6
September	11	102	5
October	5	109	20
November	9	117	6
December	10	126	17
1928 Total	106	1,215	145
1929			
January	4	129	19
February	9	121	3
March	14	186	10
(3 mos.)	28	436	32

American Refractories institute will hold its annual meeting at French Lick Springs hotel, French Lick, Ind., May 21 and 22.

Labor Supply Slackening as Production Mounts

Washington, April 9.—Immigration restriction and a marked falling in the birth rate have produced a slackening in the natural rate of population increase in the United States, which in turn is tending to bring about a tighter labor situation, according to Dr. Leo Wolman. He directed the labor section of the survey of the National Bureau of Economic Research, to be published with the report of the Committee on Recent Economic Changes of the President's unemployment conference.

Dr. Wolman asserts these factors which are making for a slackening rate of growth are apparently not temporary, and they may be expected to exert a similar influence for years to come. While admittedly the death rate is falling, the best statistical information indicates that the birth rate is falling more rapidly, with the result that the average annual increase in population during the three years ended July 1, 1928, had declined from a total of 1,800,000 per annum to 1,545,000.

Changes in the rate of growth of the total population do not necessarily reflect like changes in the supply of labor, as the rising productivity of industry may from time to time produce an increase in the surplus of labor, or the inhabitants of an undeveloped area may become employed for the first time through the development of industry, thus adding to the available supply of labor. Such forces are continuously in operation in the United States.

Comparisons between the actual flow of immigration in the prewar, war, and postwar periods show that there has been a drastic reduction in the net inflow. In the prewar period, the average annual net immigration was 664,000; in the war and early postwar period 179,000; and in the quota period (from July 1, 1921, to date) 312,000. At present the annual net immigration rate is less than half of that before the war.

New Code Aids Business

Indianapolis, April 9.—Business is expected to be greatly aided by the new corporation code passed by the Indiana legislature. The new code, approved by the governor, is effective July 1.

The rate for incorporation has been cut to one-tenth the former sum. The old limitation that a corporation could conduct only one kind of business has been removed. It is now compulsory that precedent to the formation of an Indiana corporation subscription lists must have been opened, compelling new corporations to have assets before transacting business.

More responsibility is lodged by the new code in directors and officers. It applies only to profit organizations.

Steel Wages and Output Down in 1927

Steelworks and rolling mills of the United States in 1927 numbered 486, employed 361,312 persons, paid them $601,275,499 in wages and used raw materials costing $1,689,655,499, according to the census bureau, department of commerce. The value of the industry's output in the year was $2,779,840,238. Except for the number of establishments, there was a slight reduction from 1925 in all other classifications, as the following comparative table reveals:

	1927	1925
No. establishments	486	473
Wage earners (average for year) (1)	361,312	370,726
Wages (2)	$ 601,275,499	$ 614,984,982
Cost of materials, mill supplies, fuel, purchased power (2)	$1,689,655,295	$1,811,961,218
Products, total value (2)	$2,779,840,238	$2,946,068,231
Steel-works and rolling-mill products	$2,776,389,255	$2,940,344,764
Other products, value, and receipts for custom work and repairing	$ 3,450,983	(3)$5,723,467
Value added by manufacture (4)	$1,090,184,943	$1,134,107,013
Horsepower	5,234,065	4,763,533

(1) Not including salaried employes.

(2) The amount of manufacturers' profits cannot be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

(3) Includes value of cinder and scale not reported in detail.

(4) Value of products less cost of materials, mill supplies, fuel, and purchased power.

Harvester Report Shows Heavy Sales

International Harvester Co., Chicago, in its annual report for 1928, just issued, shows that the volume of farm implement business during the last year was the largest in the company's history.

The increase was chiefly in motor truck sales, although there was a substantial gain in sales of tractors, harvester-threshers and various traction-drawn implements. The record shows a net profit for 1928 of $29,685,350 after interest on loans, depletion, depreciation, special maintenance and other charges, compared with a net of only $23,350,215 in 1927, after the same charges.

Pig Iron

(*Concluded from Page* 1013)

shipments equal to the make with some of the blast furnace interests here. Tonnage booked following the recent reduction to $15.50 for No. 2 foundry iron will provide steady operations and shipments for at least 30 days. Consumers are not carrying much iron on their yards. A little tonnage is being shipped to Ohio river districts.

Toronto, Ont., April 9.—An advance of 50 cents per ton featured Canadian pig iron prices during the week. Demand continues strong, principally for spot delivery. Contract placing for future delivery has fallen off due to the fact that most melters who place contracts are covered.

Philadelphia, April 9.—Pig iron buying generally is restricted to small lots, but reaches a substantial total. A round tonnage of basic was sold in the past week. The prices of this crude is unchanged at $20.25 to $20.50, delivered in this district. Some makers talk of an advance. Foundry iron is firm at $21, base, eastern Pennsylvania furnace. Some Birmingham No. 1 X iron has been sold for shipment north by rail and water.

Bolts, Nuts, Rivets

Good Backlogs from First Quarter—Some at Higher Price

NUT AND BOLT PRICES, PAGE 1012

Pittsburgh, April 9.—Rivet producers have substantial backlogs against first quarter contracts but some specifications already have been received against contracts at an advance of $2 a ton on large rivets over the 2.90c, Pittsburgh, price for first quarter. Specifications for bolts and nuts are holding well to the active March rate. Buying is well diversified. Mill operations hold to slightly above 70 per cent for some interests, with the general average between 65 and 70 per cent.

Cleveland, April 9.—Rivet buyers are commencing to specify against 3.10c, Pittsburgh, arrangements for second quarter, having used up their accumulations of first quarter tonnage at the 2.90c price. Sales resistance against the $4 advance is gradually disappearing. Boiler, tank, locomotive and fabricating shops seem to be taking at least normal quotas for this season. Nut and bolt buyers are fairly active. Several plants are on a 75 to 85 per cent basis. Automotive needs are heavy as are numerous other consuming lines.

Chicago, April 9.—Specifications for bolts, nuts and rivets are slightly below the March rate, due to lower production of farm tillage tools and inactivity in most building lines. Automotive and parts manufacturers are keeping up to March schedules. Second quarter contracting has been completed. No weakness is reported. Bolts and nuts are 60 to 70 per cent off, while large structural rivets are 3.20c, Chicago, in carload lots.

Foundrymen Select Cleveland for Convention in May, 1930

CHICAGO, April 9.—The American Foundrymen's association will hold its 1930 convention and exposition in Cleveland during the week of May 12. This announcement was made by C. E. Hoyt, executive secretary of the association, at the business session which opened the thirty-third annual convention at the Stevens hotel here this week. Approximately 150,000 square feet of exhibit space will be available in Cleveland's Public Auditorium which also affords meeting rooms for technical sessions.

A heavy registration of 1600 on the first day of the convention and exhibition now in progress forecasts an unusually successful meeting. At the initial technical session on cupola practice on Monday afternoon, some 300 attended.

Officers for the coming year were elected at the business meeting as follows: President, Fred Erb, Erb-Joyce Foundry Co., Vassar, Mich.; vice president, N. K. B. Patch, Lumen Bearing Co., Buffalo; directors, H. S. Falk, Falk Corp., Milwaukee; S. T. Johnston, S. Obermayer Co. and National Engineering Co., Chicago; Frank J. Lanahan, Fort Pitt Malleable Iron Co., Pittsburgh; Arnold Lenz, Chevrolet Motor Co., Saginaw, Mich.; and L. H. Wray, Henry Wray & Son, Rochester, N. Y.

Committee reports occupied much of the time at the business meeting. Dr. S. G. Werner, Verein Deutscher Eisengiessereien, Dusseldorf, Germany, and president of the Foundrymen's International committee invited members of the American Foundrymen's association to attend the international congress in London in June, 1929.

Foundrymen found much of interest in the display of equipment in the exhibit hall of the hotel. About 150 manufacturers of foundry equipment and supplies are represented, and although the hall is limited in space, practically all the developments in foundry equipment during the past year are shown.

At a dinner for exhibitors served Monday evening under auspices of the Foundrymen's association and the Foundry Equipment Manufacturers association, more than 200 attended. Speeches were made by S. T. Johnston, president of the foundrymen; Dr. S. G. Werner; and H. W. Standart and H. Cole Estep, president and secretary, respectively, of the Equipment Manufacturers association. At another dinner for engineering and shop instructors, the speakers were Dan M. Avey, editor, *The Foundry*, Cleveland, and John W. Bolton, Lunkenheimer Co., Cincinnati.

Technical sessions filled the program for Tuesday. These included meetings devoted to foundry costs, steel founding, cast iron metallurgy, nonferrous foundry cost methods, steel practice, foundry management and practice, and sand control. The convention will close Thursday evening.

Republic Sets Records at Southern Plants

Birmingham, Ala., April 9.—Southern properties of Republic Iron & Steel Co. made several records in March. Raimund ore mines produced 56,327 tons of ore, against 55,346 tons in March, 1927, the previous record. Sayreton coal mines produced 58,849 tons of coal, against 48,831 tons for March, 1927. No. 2 blast furnace, Thomas, made an average of 442 tons of pig iron daily, against 420 tons in February, 1929. No. 2 blast furnace, Thomas, made 13,691 tons in March, compared with 12,381 tons in March, 1927. Two blast furnace stacks at Thomas in March made 26,187 tons of pig iron. The Republic company is skimming iron at the pig machine.

Reports Gains in 1928

Toronto, Ont., April 9.—Iron and steel output of the British Empire Steel Corp. increased notably in 1928, according to report at the annual meeting in Montreal, April 2. Output of coke in 1928 was 415,186 net tons, compared with 369,736 tons in 1927. Last year's production of pig iron was 302,756 gross tons, against 244,366 tons in 1927. The corporation's tonnage of steel ingots in 1928 was 390,755, compared with 296,204 in 1927.

Will Broaden Its Line

Expansion of the Trussed Concrete Steel Co., Ltd., Walkerville, Ont., with promise of early introduction of new products is expected to result from acquisition of all stock of the company by the Truscon Steel Co., Youngstown, O., which has held a majority of the stock. Authorized capital stock of the Trussed Concrete company, of which Harry Mero is president and general manager, consists of $100,000 preferred and $400,000 common. The company has manufactured Truscon products for the Canadian trade under a licensed arrangement. No changes of policy or management are contemplated.

Named in Second Suit

New York, April 9.—Bethlehem Steel Co. has filed another suit in federal court at Newark, N. J., against the United States Steel Corp., Carnegie Steel Co. and the American Bridge Co., all New Jersey corporations, alleging infringement of patents. A preliminary injunction to restrain the use of the patents in question also was asked. In an earlier action the Bethlehem company acted jointly with the American Universal Mill Co., Scranton, Pa. The additional suit seeks an accounting of profits on which to base the amount of damages.

Seek Evidence Abroad

New York, April 9.—Search for evidence to be supplied by both sides in the patent litigation brought by the Bethlehem Steel Co. against the United States Steel Corp., involving the production of thin web wide flange structural sections, has shifted to Europe. Hoyt A. Moore, chief attorney for the Bethlehem corporation in this case, sailed for Europe Saturday. D. A. Usina, general patent attorney for the Steel corporation, will sail for Europe tomorrow.

Car Orders Pile Up

Washington, April 9.—Railroads March 1 had 37,820 freight cars on order, compared with 30,316 Feb. 1 and 21,726 March 1, 1928. Of the cars on order as of March 1, 16,989 were box, 15,234 were coal and the remainder miscellaneous.

Locomotives on order March 1 totaled 291, against 171 a year ago.

Stake Out Newton Mill

Stakes marking off the site of the new sheet mill of the Newton Steel Co., Youngstown, O., near Monroe, Mich., have been driven by engineers for Arthur G. McKee & Co., Cleveland. The mill is to be ell-shaped, 1306 feet long, 580 feet on the east side, and 250 feet on the west side. Engineers are now making tests of the soil.

The Owen Bucket Co., Breakwater avenue, Cleveland, has installed a 6-ton bucket in the new $1,000,000 plant of the Pacific Coast Cement Co., Seattle.

Machine Tool Census Shows Increase

Department of commerce announces that, according to data collected at the biennial census of manufactures taken in 1928, the establishments engaged primarily in the manufacture of machine tools in 1927 reported products valued at $159,513,125, of which amount $136,745,605 was contributed by machine tools (including parts and attachments) and $22,767,520 by miscellaneous products. The value of machine tools shows an increase of 13.9 per cent as compared with $120,041,179 reported for 1925, the last preceding census year.

The total production of machine tools in 1925 was valued at $123,652,005, of which amount $120,041,179 was contributed by establishments in the machine tool industry, as classified for census purposes, and $3,610,826 by establishments in other industries which made machine tools as secondary products.

Of the 355 establishments in the industry reporting for 1927, 89 were located in Ohio, 37 in Illinois, 33 in Connecticut, 32 in Michigan, 30 in Massachusetts, 28 in Pennsylvania, 25 in New York, 19 in Wisconsin, 12 in Indiana, 12 in New Jersey, eight in Rhode Island, six in Missouri, five in California, five in Vermont, four in New Hampshire, and the remaining 10 in seven other states. In 1925 the industry was represented by 329 establishments.

The statistics for 1927 and 1925 are summarized in the accompanying table. The figures for 1927 are preliminary and subject to such correction as may be found necessary after further examination of the returns.

Summary for Machine Tool Industry

	1927	1925	Per cent increase or decrease
Number of establishments	355	329	7.9
Wage earner (average for the year)*	35,269	30,831	14.4
Wages**	$ 52,365,692	$ 46,711,302	12.1
Cost of materials, factory supplies fuel, and purchased power, total**	$ 46,114,849	$ 43,826,151	5.2
Materials and supplies	$ 43,426,954	(***)	.....
Fuel and power	$ 2,687,895	(***)	.....
Products total value**	$159,513,125	$144,202,483	10.6
Machine tools, including parts and attachments	$136,745,605	$120,041,179	13.9
Other products, value, and receipts for contract work and repairing	$ 22,767,520	$ 24,161,304	—5.8
Value added by manufacture****	$113,398,276	$100,376,332	13.0
Horsepower	150,331	118,819	26.5

*Not including salaried employes.

**The amount of manufacturers' profits cannot be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

***Not reported separately.

****Value of products less cost of materials, factory supplies, fuel, and purchased power.

Cheney Bigelow Wire Works, Springfield, Mass., has declared an initial quarterly dividend of 25 cents a share on common stock, thereby placing the issue on a $1 annual basis.

Casts Longer Pipe Units

Cast iron pipe in 18-foot lengths is now offered by the United States Cast Iron Pipe & Foundry Co. Length of cast pipe has been increased from the original 3 and 4 feet to 16 feet as methods of manufacture improved, each increase making handling easier and reducing the number of joints. The new lengths are of centrifugal cast pipe and the lessened weight of that class of pipe allows the greater length without increasing weight unduly.

The company has established a battery of machines at its plant at Birmingham, Ala., for production of the new length of the same quality as the former standard lengths.

Algoma Makes Record

Toronto, Ont., April 9.—Algoma Steel Corp., Sault Ste. Marie, Ont., established a number of records in March. Coke output in the month was 52,306 tons, against the previous record of 50,565 tons. Open-hearth ingot production in March was 50,639 tons, contrasted with the previous top of 48,799 tons. Open-hearth department set a new daily record, March 30, with 2592 tons. Rail mills March 30 made 1067 tons in a 13-hour shift, beating out the previous high record of 988 tons in a similar period.

Revises Specifications

Washington, April 9.—The federal specification board, bureau of standards, department of commerce, has issued a revised master specification for concrete reinforcing bars for use of various government agencies in making purchases of these materials. The new specifications are effective June 25.

Simplified Practice Offers New Approach for Advertising Copy

PROFESSIONALLY the advertising man occupies a major position in making the simplified practice campaign a success, declares S. F. Tillman, division of simplified practice, department of commerce, Washington.

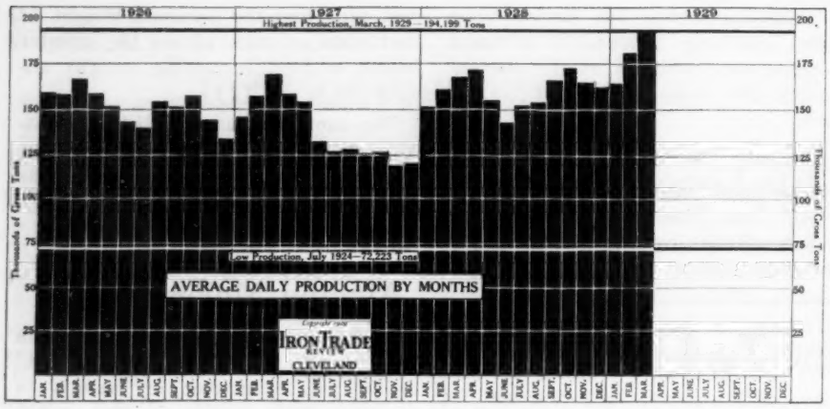
Manufacturers and distributors generally are in accord with the campaign; a greater concentration of buying effort on the simplified lines by consumers, who are influenced by the advertising man, will hasten the ultimate objectives—reduced prices, higher wages and higher standards of living. Says Mr. Tillman, further:

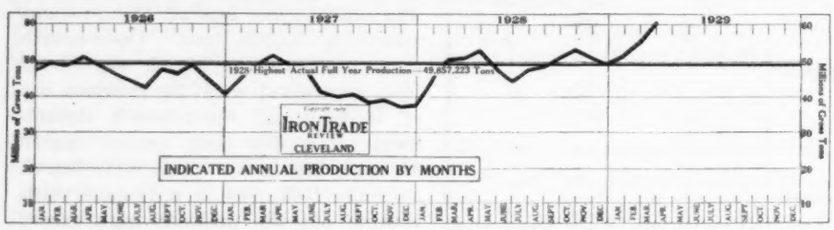
Much of the success, simplified practice has received, can be attributed to the co-operation received from the trade papers and daily press. While not actual participants in the development of a simplified program, the press, both trade and daily, has carried the news of the progress made in simplification to its readers, representing those who either make or sell the product.

The importance of the part played by trade papers in reporting activities pertaining to the development of simplified programs may be realized when one considers the fact that trade papers are generally considered as being indispensable to the business man, be he an industrial executive or small merchant. They relate the achievements of individuals and organizations; present the biographies of the outstanding men of the business world, as well as recording the advance in the art.

It has often been said that the trade press constitute without question the livest element in a special collection of modern business literature. In the pages of the trade papers the readers will find the most authoritative and up-to-date information of interest to their craft.

Featuring simplified practice in advertising is claimed to be effective. One manufacturer of electric switches recently reduced his variety from 17 to 1, impressing the fact that marked savings in stocks, deliveries and labor cost for installation and increased turnover resulted. An appeal to the consumer that simplified practice results in better value for the money is possible, according to Mr. Tillman.





March Ingots All-time Record

STEEL ingot production soared in March to the unprecedented height of 194,199 gross tons a day. This rate makes short-lived the previous record of 179,926 tons daily, registered in February. By 27 per cent it exceeds the highest daily rate attained in the war period.

Were the gait of March, as compiled by the American Iron and Steel institute, to be maintained throughout the year, the 1929 total would approximate 60,395,000 tons. The 49,857,223 tons produced in 1928 constituted a record for a full year.

Since July, every monthly statistical report on ingot production, excluding crucible and electric ingots, has revealed a record. October, February and March successively have set all-time peaks, while the intervening months were monthly highs.

On a percentage basis, March is the first month on record, apparently, in which the industry exceeded its rated capacity. The March rate is given by the institute as 103.02 per cent, compared with 95.44 per cent in February and only 88.06 per cent last March.

On a tonnage basis, the 5,049,176 tons of March—the first month ever to cross the 5,000,000-mark—compares with 4,318,233 tons in February and 4,507,520 tons in March a year ago.

In all points the first quarter of 1929 has been a record. The 13,849,701 tons of this period by a fair margin passes the previous best first quarter, that of 1928, by 1,305,545 tons.

Open hearth production in March of the companies reporting, which represents 94.68 per cent of the industry, was 4,183,869 tons and of bessemer ingots, 596,691 tons. The open hearth output in the first quarter of 1929 was 11,477,311 tons while bessemer output was 1,635,586 tons.

A comparision of record ingot production, judged by daily rates, follows:

Month	Daily rate (gross tons)
March, 1929	194,199
February, 1929	179,926
October, 1928	172,144
April, 1928	172,103
March, 1927	166,633
March, 1926	165,504
March, 1924	161,796
April, 1923	158,549
September, 1918	153,289

Steel Ingot Production—1928-1929

94.68 Per Cent of Industry Reporting

Gross Tons

1928	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	Number of working days	Approximate daily output all companies	Per cent of operation
Jan.	3,280,247	498,746	3,778,993	3,991,332	26	153,513	81.43
Feb.	3,308,728	521,366	3,830,094	4,045,304	25	161,812	85.84
March	3,700,411	567,309	4,267,720	4,507,520	27	166,945	88.56
3 mos.	10,289,386	1,587,421	11,876,807	12,544,156	78	160,823	85.31
April	3,509,637	564,039	4,073,676	4,302,573	25	172,103	91.29
May	3,397,631	581,949	3,979,580	4,203,190	27	155,674	82.58
June	3,016,487	527,351	3,543,838	3,742,964	26	143,960	76.37
July	3,075,247	533,550	3,608,797	3,811,573	25	152,463	80.88
Aug.	3,386,750	569,436	3,956,186	4,178,481	27	154,759	82.09
Sept.	3,381,917	545,015	3,926,932	4,147,583	25	165,903	88.01
Oct.	3,802,396	598,227	4,400,623	4,647,891	27	172,144	91.32
Nov.	3,441,985	590,796	4,032,781	4,259,380	26	163,822	86.90
Dec.	3,308,872	496,726	3,805,598	4,019,432	25	160,777	85.29
Total	40,610,308	6,594,510	47,204,818	49,857,223	311	160,313	85.04
*Revised							
1929							
Jan.	*3,694,218	549,616	*4,243,834	*4,482,292	27	*166,011	*88.06
Feb.	*3,599,224	489,279	*4,088,503	*4,318,233	24	*179,926	*95.44
March	4,183,869	596,691	4,780,560	5,049,176	26	194,199	103.02
3 mos.	11,477,311	1,635,586	13,112,897	13,849,701	77	179,866	95.41

*Revised.

Figures exclude crucible and electric ingots. Operation percentages for 1928 and 1929 are based on an annual open-hearth and bessemer steel ingot capacity of 58,627,910 tons as of Dec. 31, 1927.

Urges Higher Ore Duty

Washington, April 9.—James G. Gerard, New York, former ambassador to Germany, now interested in a manganese ore company in Virginia, has suggested a tariff of 1½ cent per pound on manganese ore, in a letter to a United States senator.

According to Mr. Gerard, an increase in the tariff from 1 cent to 1½ cents per pound would increase the cost of steel only 8 cents per ton and would result in the upbuilding of a domestic industry. He points to England and France as spending large sums to develop sources of manganese ore.

Freight Car Needs Huge

Washington, April 9.—Shippers' regional advisory board estimates that in the second quarter approximately 8,836,714 cars, an increase of 612,844 cars or 7.5 per cent over the second quarter of 1928, will be required to carry carload shipments of 29 principal commodities. Shippers estimate that second quarter shipments of iron and steel will require 10 per cent more cars than a year ago, machinery and boilers 9.5 per cent, coal and coke 14.7 per cent, automobiles 17.7 per cent, and implements 10.5 per cent.

Taking Bids on Cruisers

Washington, April 9.—Bids on the construction of two cruisers of the 15 authorized at the last session of congress will be taken by Secretary of the Navy Adams until May 25.

Use Much Semifinished

Establishments in Cleveland and its environs engaged in the manufacture of air, land and water transporta-

tion equipment doing an annual business of $100,000 or more, purchased in 1927 semifinished products valued at $85,966,217 and sold finished products amounting to $148,170,583, according to the census of industrial purchases conducted by the department of commerce, Washington.

Automobile parts and materials purchased in 1927 were valued at $21,610,093. Purchases of steel sheets, bars, rods, etc. were valued at $13,977,856; of automobile engines, frames, radiators, etc., $8,439,410; automobile body hardware and bolts, nuts, screws, washers, etc., $5,388,256; gray iron, steel and malleable castings, $3,096,894; steel forgings, $2,437,719; and, electrical equipment, $1,297,288.

Can Congress Be Held Down to Tariff Revision and Farm Relief?

By Lynne M. Lamm

WASHINGTON, April 9.—The first or special session of the Seventy-first congress convenes here Monday. The avowed purpose is to deal with the tariff and farm relief legislation. It is being freely predicted here, however, that the administration will not be able to "muzzle" congress.

One thing must be borne clearly in mind. Congress cannot call itself into session, it must be called to convene by the President; but once it is in session, the President cannot adjourn congress, nor can he by law prevent congress from taking action on any legislation that it desires. Only by controlling the votes of the two houses of congress does the President control legislation.

From time to time, statements have been made by leading members of congress to the effect that the legislation will be able to adjourn by July 1 or certainly by July 15. Some differ materially from this view, and believe congress will be in session until the autumn or, seeing that it cannot complete the tariff, may adjourn in midsummer and meet again in autumn.

Protests are beginning to trickle in from various parts of the country on any "partial" tariff adjustment, such as is contemplated by the administration and asking that the revision be general. One of the latest is from the Illinois Manufacturers' association.

At a protest meeting sponsored by the Illinois association, attended by manufacturers from Illinois, Indiana and Wisconsin, a resolution was adopted declaring growing imports as an "increasing menace to American industry, agriculture and labor."

It was also recommended that directors of the association petition the finance committee of the senate "for full hearings, with a view to general tariff revision." This latter recommendation is evidently the result of the current rumor that the senate committee would not hold any tariff hearings but rely on the hearings held by house ways and means committee.

In addition to the tariff and farm relief, it is possible that the President may ask congress for some action on the immigration question and it is also expected that the matter of the census and the congressional appointment will again come up. These are only a few of the important questions mentioned as likely to receive attention.

Representative Cordell Hull, of Tennessee, an influential Democratic member of the ways and means committee, is complaining about the flexible provisions of the tariff act and asking that they be curtailed. On the other hand, prominent Republican members are complaining that these provisions should be broadened rather than curtailed. The committee is grinding along with some degree of success and leaders are still maintaining that the new tariff law will be reported to the house not later than April 20.

Immigration on National Origin Basis Unless Congress Intervenes

WASHINGTON, April 9.—There is considerable conjecture here as to what, if anything, the next session of congress will be asked to do in connection with the national origin immigration situation.

President Hoover is opposed to this act and was when he was secretary of commerce, but he was required to issue a presidential proclamation putting the act into effect July 1, 1929, the attorney general advising such a course.

Many members of congress are in agreement with the President on this problem and while they favor, along with the President, restricted immigration, they do not favor the present act as it will actually work out.

"The attorney general has advised me," said President Hoover at a recent press conference at the White House, "that in failure of congress to suspend action, it is now mandatory upon me under the immigration act to issue the proclamation establishing 'national origins' as the basis of immigration quotas.

"It will go into effect July 1 unless action is taken by congress in the meantime. While I am strongly in favor of restricted and selection immigration I have opposed the national origins basis. I therefore naturally dislike the duty of issuing this proclamation and installing the new basis but the President of the United States must be the first to obey the law."

The annual quota of each nationality for the fiscal year beginning July 1, 1929, and for each fiscal year thereafter will be as follows:

Country or Area	Quota
Afghanistan	100
Albania	100
Andorra	100
Arabian peninsula	100
Armenia	100
Australia (including Tasmania, Papua, and all islands appertaining to Australia)	100
Austria	1,413
Belgium	1,304
Bhutan	100
Bulgaria	100
Cameroon (British mandate)	100
Cameroon (French mandate)	100
China	100
Czechoslovakia	2,874
Danzig, Free City of	100
Denmark	1,181
Egypt	100
Esthonia	116
Ethiopia (Abyssinia)	100
Finland	569
France	3,086
Germany	25,957
Great Britain and Northern Ireland	65,721
Greece	307
Hungary	869
Iceland	100
India	100
Iraq (Mesopotamia)	100
Irish Free State	17,853
Italy	5,802
Japan	100
Latvia	236
Liberia	100
Liechtenstein	1,000
Lithuania	386
Luxemburg	100
Monaco	100
Morocco (French and Spanish Zones and Tangier)	100
Muscat (Oman)	100
Nauru (British mandate)	100
Nepal	100
Netherlands	3,153
New Zealand	100
Norway	2,377
New Guinea, Territory of (including appertaining islands) (Australian mandate)	100
Palestine (with Trans-Jordan) (British-mandate)	100
Persia	100
Poland	6,524
Portugal	440
Ruanda and Urundi (Belgian mandate)	100
Rumania	295
Russia, European and Asiatic	2,784
Samoa, Western (mandate of New Zealand)	100
San Marino	100
Siam	100
South Africa, Union of	100
South West Africa (mandate of the Union of South Africa	100
Spain	252
Sweden	3,314
Switzerland	1,707
Syria and the Lebanon (French mandate)	123
Tanganyika (British mandate)	100
Togoland (British mandate)	100
Togoland (French mandate)	100
Turkey	226
Yap and other Pacific islands under Japanese mandate	100
Yugoslavia	845

Industrial Men in the Day's News

James F. Lincoln, President, Lincoln Electric Co.

CREDITED with between 40 and 50 patents applicable to and in the electric welding industry, he is conceded to be an authority in that branch of the welding profession.

TWENTY years after leaving Ohio State university, it conferred upon him the honorary degree of electrical engineer and he is now president of of its alumni organization.

HIS initial position in his company was one as salesman, in 1906. Made vice president and general manager in 1914, he has been its executive head ever since.

BELIEF in himself, his job, his company's product and the science or profession they all represent, has carried James F. Lincoln to the presidency of the Lincoln Electric Co., Cleveland, with branch offices and agencies in at least a score of cities. A brief announcement of his promotion was made in IRON TRADE REVIEW of April 4, which issue also carried an interesting statement by him on the evils of reciprocal business. He succeeded his brother, J. C. Lincoln, who was made chairman of the board.

Although "Jim" Lincoln, as he is familiarly known to his friends, did not graduate from Ohio State university, Columbus, O., sickness and lack of funds bringing an end to a brilliant college career in 1906, that institution conferred upon him its honorary degree of electrical engineer in June, 1926, because of his record in that profession in the intervening two decades.

Up to that time he had about 27 patents in the electrical industry to his credit and since then the number has increased to between 40 and 50. Chief among these are the automatic carbon arc welder, the variable voltage arc welder, the use of arc welded steel in motors, etc. Back in 1908 he was granted a patent for his automatic charging equipment for electric automobiles. He was among the first to visualize the potentialities of electric arc welding as a manufacturing tool. So certain was he that arc welded steel construction would attain important proportions, he insisted on redesigning the complete line of motors and welders manufactured by the company in order to utilize this process.

Mr. Lincoln was born May 14, 1883, at Painesville, O., where he obtained his elementary and high school education. He entered Ohio State in 1902 and after leaving in 1906, he was employed as salesman by the Lincoln Electric Co., which his brother, John C. Lincoln, had organized at Cleveland in 1896. He was elected vice president in 1909 and made vice president and general manager Jan. 1, 1914. Since that time he has been nominal executive head of the company and his recent election is but a formal acknowledgment of that fact.

His duties now, however, will afford him additional time to devote to electrical research and experimental development work which have constituted his major interest for the past several years. Experiments in which he participated resulted in the arc welder his company has marketed all over the world. The widespread use of the 2-speed induction motor also is partially due to his efforts and energy. During the war, Mr. Lincoln performed extensive work for the government which had for its goal the building of a completely welded ship.

Mr. Lincoln is a member of the American Institute of Electrical Engineers, of which he served a managerial term, 1918-1919; the American Society of Mechanical Engineers, and the American Welding society. He was elected president of the Ohio State university association, alumni organization of the Ohio State university, in 1927, and in April of that same year he was elected first vice president of the Cleveland chamber of commerce. He is a member of the Engineers' Club of New York, Union club and Shaker Heights Country club, Cleveland. He obtains physical exercises on the handball courts as well as on golf courses and at his fishing shack in Canada.

Men of the Industry

JAMES G. DAVEY, who has been in charge of the finishing department of the Empire Steel Corp., Mansfield, O., was recently appointed sales manager at Philadelphia. He succeeds W. L. Hoffman, decreased. He has been associated with the sheet industry since boyhood, having worked in every department from open-hearth furnace to sales.

* * *

Roy D. Kerby, recently manager of the Durant Motors of Canada, has been elected president.

* * *

H. M. Schaab has been appointed manager of steel door sales of the Truscon Steel Co., Youngstown, O.

* * *

Patrick H. Joyce, vice president, Standard Steel Car Co., Chicago, has been elected a director of the Chicago Great Western railroad.

* * *

Willis H. Ramsey, formerly vice president, Morgan Engineering Co., Alliance, O., has been made a member of the Alliance school board.

* * *

A. W. French, president of A. W. French & Co., Chicago, recently merged with the Blaw-Knox Co., Pittsburgh, has been elected to the Blaw-Knox directorate.

* * *

Frank R. Frost, president, Superior Steel Corp., Pittsburgh, has been elected a member of the board of directors of the Rustless Iron Corp. of America, Pittsburgh.

* * *

L. P. Noyes, for 15 years traffic manager for the May Co., Cleveland, has become Cleveland district manager of the Container Freight Forwarding Co., 416 Penton building, Cleveland.

* * *

J. B. Clark resigned recently as general superintendent of the Donora, Pa., plant of the American Steel & Wire Co. He has been with the company for 48 years. The resignation is to become effective this summer.

* * *

L. E. Gulliford, formerly general superintendent of the McMyler-Interstate Co., Bedford, O., has been made general manager of the Pulaski Foundry & Mfg. Co., Pulaski, Va. He has been identified with the McMyler company for about 17 years, but has been engaged in the heavy machinery and construction industry for more than 25 years.

* * *

Perry W. Harvey was elected a director of M. A. Hanna Co., Cleveland, to succeed H. E. Booth, who resigned last year to become vice president in charge of sales of the Pittsburgh Coal Co. Other directors and officers were re-elected.

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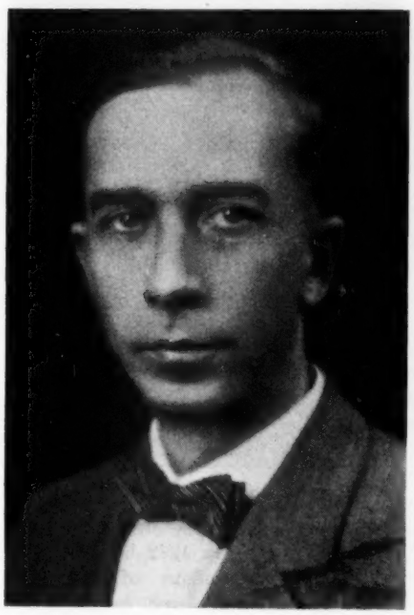
Howard H. Talbot has been appointed chief engineer of the United Engineering & Foundry Co., Pittsburgh, succeeding the late Lane Johnson. Mr. Talbot joined the United Engineering company in 1923, having previously been connected with the



HOWARD H. TALBOT

Mackintosh-Hemphill Co. as chief engineer at the Woodard Machine Co. department, Wooster, O., and prior to that was engineer for the William Tod Co., Youngstown, and the Connecticut Co. New Haven, Conn., public utility subsidiary of the New York, New Haven & Hartford railroad. He is a graduate of Beloit college, Beloit, Wis., and Case School of Applied Science, Cleveland.

* * *

A. E. Staley Jr. was recently elected executive vice president of A. E. Staley Mfg. Co., Decatur, Ill., a newly created position. He relieves his father, A. E. Staley Sr., president of the company, from numerous details and responsibilities in connection with plant operation, since he will have general supervision of all plants.

* * *

Frederick J. Griffith, chairman of the board of the Central Alloy Steel Corp., Massillon, O., arrived in New York April 3 from a European trip on which he studied the steel industry of England, France and Germany, with special reference to the new alloy steels.

* * *

Charles S. Davis, secretary-treasurer of the Warner Gear Co., Muncie, Ind., was recently elected president of the Borg-Warner Corp., of which the Warner company is a unit. He succeeds George Borg, who assumed the chairmanship of the board of directors.

* * *

Stanley B. De Long has been elected president of the Pierce, Butler & Pierce Mfg. Corp. to succeed Roger Morton. The company has its general offices at 41 East Forty-second street, New York and its principal manufacturing plants at Eastwood, N. Y., Huntingdon, Pa., Zanesville, O., and Oswego, N. Y.

* * *

Horace H. Bridgewater, formerly in the sales promotion department of Andrew C. Campbell Inc., Bridgeport, Conn., manufacturer of special machine tools, has been appointed to have charge of sales inside, while H. R. Powell, formerly of the American Cable Co., has been appointed to have charge of field sales.

* * *

August A. Busch, president of the Busch-Sulzer Bros. Diesel Engine Co., St. Louis, was recently elected chairman of the board. He is succeeded by Edward B. Pollister, formerly second vice president, who will continue to act as general manager. C. Drummond Jones, fourth vice president and secretary-treasurer, has been named second vice president, succeeding Mr. Pollister but will continue also as secretary-treasurer.

* * *

W. F. Angermyer, Pittsburgh, has been elected president of the Sheet Metal Contractors association of Pennsylvania at its recent annual convention at Lancaster, Pa. Vice presidents are: Joseph Long, Lancaster, and C. F. Luppold, Reading, Pa. Other officers are: Treasurer, H. G. Hartline, Erie, Pa., and secretary, M. F. Lieberman, Ambridge, Pa. J. I. Thomas, Lewistown, Pa., and

John E. Pohl and Emile F. Bordt, Lancaster, were elected directors.

* * *

Taylor Allderdice, formerly president of the National Tube Co., Pittsburgh, has been elected a director of the Dahlberg Corp. of America.

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George H. Niekamp, vice president of the Beck & Corbitt Iron Co., St. Louis, has been elected president of the St. Louis Radio Trades association, that city.

* * *

Robert Mitchell has been appointed works manager for the Stutz Motor Car Co. of America Inc., Indianapolis, to succeed W. K. Swigert, who resigned recently as noted in IRON TRADE REVIEW of March 21.

* * *

Matthew C. Brush, chairman of the American International Corp., New York, and Charles E. Adams, president of the Air Reduction Co. Inc., that city, have been elected directors of the Vanadium Corp of America.

* * *

G. H. Kuechler has been appointed Michigan representative of Thomas E. Murray Inc., 88 Lexington avenue, New York, designing and consulting engineer. His headquarters are at 2702 Eaton Tower building, Detroit.

* * *

H. L. Johnston, at one time identified with the General Electric Co., Cincinnati, O., who founded the Hobart Mfg. Co., Troy, O., in 1893, assisting in its executive affairs ever since, has been elected its president.

* * *

Thomas H. Winston was recently appointed Philadelphia district representative of the Skinner Chuck Co., New Britain, Conn. His headquarters are at 14 Guaranty Industrial building, 2401 Chestnut street, Philadelphia.

* * *

E. C. Anderson was recently added to the sales force at the Chicago office of the Modern Tool Division, Consolidated Machine Tool Corp. of America, Rochester, N. Y., builder of machine tools and plate shop equipment. He formerly was identified with the Stocker-Rumely-Wachs Co., Chicago.

* * *

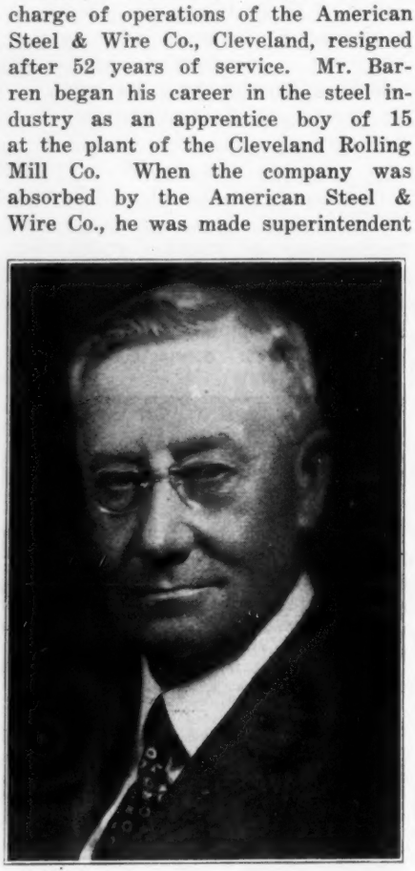
W. J. Schuler, who for some time prior to the death of H. W. Thompson, noted on page 955 of IRON TRADE REVIEW, April 4, assisted him in the sale of washing machines manufactured by the Lovell Mfg. Co., Erie, Pa., has been appointed to succeed him as assistant to the president in charge of sales.

* * *

Preston L. Sutphen has been appointed sales manager of the Electric Boat Co., 11 Pine street, New York. This company recently absorbed the New London Ship & Engine Co., New London, Conn., and all products of the two companies will be marketed under the name of the Electric Boat Co.

* * *

Henry A. Barren, vice president in charge of operations of the American Steel & Wire Co., Cleveland, resigned after 52 years of service. Mr. Barren began his career in the steel industry as an apprentice boy of 15 at the plant of the Cleveland Rolling Mill Co. When the company was absorbed by the American Steel & Wire Co., he was made superintendent



HENRY A. BARREN

at Newburg, O. In 1912 he was made general superintendent of Cleveland plants and furnaces and twelve years later was appointed general superintendent of all works. When in January, 1928, John S. Keefe was elected to the presidency, Mr. Barren was elected vice president in charge of operations.

* * *

John G. Cottle has been appointed railroad sales representative at Chicago for the Reading Iron Co., Reading, Pa., to succeed H. L. Shepard, resigned. Mr. Cottle has been connected with the Chicago sales office of that company for several years.

H. D. Pollard now is in charge of the company's Kansas City office, and O. L. McGinn has been added to the Chicago sales force.

* * *

Arthur L. Meyer has been appointed assistant general manager of sales of the Alan Wood Steel Co., Conshohocken, Pa. Mr. Meyer for two years has been connected with the alloy division of the sales department of the Illinois Steel Co., Chicago. Prior to that time he had been associated for many years with the operating department as metallurgical engineer and later with the sales department.

* * *

Alan H. Harris Jr., for nine years coke oven superintendent of the Lackawanna, Pa., plant of the Bethlehem Steel Co., resigned to become affiliated with the sales staff of the Koppers Construction Co., Pittsburgh. Prior to joining the Lackawanna Steel Co., absorbed by the Bethlehem company in 1922, Mr. Harris had been superintendent of the Coal Products Mfg. Co., Joliet, Ill., for five years. He was graduated from Stevens Institute of Technology in 1911 and entered the gas business in 1913 as a cadet engineer with the Providence Gas Co.

* * *

Gordon S. Rentschler, at one time chairman of the board and director of the Hooven, Owens, Rentschler Co., Hamilton, O., builder of presses, sugar machinery and other equipment and which last December was merged with the Niles Tool Works, and since has been known as the General Machinery Corp. has been elected president of the National City Bank, New York. The bank is the largest in America. He joined the National City bank in 1923. In 1925 he was made vice president and assistant to the president and less than four years later became president.

* * *

Edward J. Holljes was recently made sales manager for William Sellers & Co. Inc., Philadelphia, heavy machine tool and locomotive injector manufacturer. He has been affiliated with the company since 1909, directing sales for a number of years. He was graduated in 1908 from Lehigh university and took a special apprenticeship course in the shops of the Baldwin Locomotive Works, Philadelphia. Initially he covered the southeastern territory for the Sellers company and later became special traveling representative. In 1921 he visited many European countries in his company's interest.

Gulf Head Buys Railroad

Birmingham, Ala., April 9.—Tennessee, Alabama & Georgia railroad, extending from Chattanooga, Tenn., to Gadsden, Ala., has been purchased by W. H. Coverdale and William Colpitts, of Coverdale & Colpitts, engineers, New York. Mr. Coverdale is president of the Gulf States Steel Co.

Obituaries

JOHN E. JENNINGS, vice president, Millikin Bros.-Blaw-Knox Corp., New York, the export subsidiary of the Blaw-Knox Co., Pittsburgh and Blawknox, Pa., died at New York, March 27. Mr. Jennings was born in Brooklyn, N. Y., in 1875 and was graduated from Cooper Union university in 1896. He became affiliated with Millikin Bros., New York, structural steel fabricators and was a pioneer in the development of steel towers for high tension electric transmission systems. He became vice president and chief engineer of the Millikin Bros. Mfg. Co. when it succeeded Millikin Bros. Inc. and when it became affiliated with the Blaw-Knox Co. in the fall of 1927, he continued in these capacities.

* * *

Samuel R. Avis, 85, gun manufacturer, New Haven, Conn., died March 31.

* * *

Robert Gray, who for many years was engaged in the automobile manufacturing industry at Chatham, Ont., died March 31.

* * *

William Henry Brown, 88, one of the founders and for years president of the Brown-Ketcham Iron works, Indianapolis, died there recently.

* * *

W. H. Mellert, 74, formerly Philadelphia tool salesman, Bethlehem Steel Co., died March 20 at his home, Sharon Hill, Pa. Mr. Mellert retired several years ago.

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Joseph Stadleman, 52, an authority on steel construction and ship building, died April 7 at Pittsburgh. During the World war he served in the employ of the government as a battleship constructor.

* * *

Ledyard Cogswell, a director of the Ludlum Steel Co., Watervliet, N. Y., died March 10 at Charleston, S. C. Mr. Cogswell was chairman of the board of directors of the New York State National bank.

* * *

Charles E. Carpenter, 67, for many years president of E. F. Houghton & Co., Philadelphia, manufacturers of oils and leathers for industrial purposes, died at Miami Beach, Fla., April 7. Mr. Carpenter was active for many years in local, state and national Republican campaigns and was a member of the Manufacturers, Poor Richard, Philadelphia country, White March Valley Country, and Manasquan River Yacht clubs and other organizations. He wrote editorials on social, economic and religious subjects for his company's house organ "The Houghton Line."

* * *

E. A. Wallberg, 61, organizer of several industrial companies in Canada, including the Leaside Engineering Co., Toronto, Ont., wartime munition maker and which at the close of hostilities became the Canada Wire & Cable Co., with him as president, died March 29 at Battle Creek, Mich.

* * *

Eugene A. Riotte, 49, former president of the Standard Motor Construction Co., Jersey City, N. J., died April 4 at Miami Beach, Fla. Mr. Riotte's company during the World war supplied the internal combustion engines used in the 110-foot submarine chasers by the United States, England, France and Italy.

* * *

Herman A. Ball, president, Ball Boiler & Tank Co., Milwaukee, died March 28. He was born in Milwaukee in 1877 and for years was connected with the Chain-Belt Co. He resigned as plant foreman 12 years ago to establish his own company, which specialized in the production of a copper tube boiler of his own design.

* * *

Frank C. Johnson, at one time head of the office department, American Steel & Wire Co., Anderson, Ind., moving to Anderson from Kentucky when the plant was moved, died recently at Richmond, Va. Resigning shortly after the general offices of the American company were removed to Chicago, Mr. Johnson returned to Anderson to engage in other manufacturing business.

* * *

Anthony C. Kloman, 79, holder of a number of patents on iron and steel making and rolling mill equipment and a former associate of Andrew Carnegie, died at Pittsburgh, April 7. His father was the founder and owner of the old Superior mill at Pittsburgh which formed the nucleus of the present Carnegie Steel Co. At the age of 21 Mr. Kloman obtained the patent for the first universal rolling mill in the world and he later perfected and patented a hot blast stove for blast furnaces. Mr. Kloman became an associate of Andrew Carnegie when the Kloman mills were taken over and assisted Mr. Carnegie in his acquisition of other steel properties in the formation of the Carnegie Steel Co.

* * *

Hon. William Harty, 82, who in 1881 organized the Canadian Locomotive Co., Kingston, Ont., of which he was managing director, becoming president in 1900 upon its reorganization, died April 1 in Kingston. He retired a few years ago and was succeeded by his son, William Harty. Mr. Harty was formerly minister of public works for Ontario and for 10 years represented Kingston in the Dominion parliament.

* * *

Harry W. Weller, 71, vice president of Babcock, Wilcox & Goldie McCullough, died April 1 at Montreal, Que. He was born in England and studied electrical and civil engineering. He located in Montreal 41 years ago as manager of the Canadian branch of his firm, and held that position until 1923, when he was made vice president in charge of eastern sales. Mr. Weller was a member of the American Institute of Electrical Engineers, the Canadian Institute of Mining and Metallurgy, and several other scientific bodies.

March Locomotives Up

Washington, April 9.—Shipments of electric industrial locomotives in March advanced moderately over February, according to the department of commerce. Monthly comparisons follow:

Year and Month	Shipments Domestic Total	Steam	Electric	Unfilled orders Domestic Total	Steam	Electric
1928						
Jan.	47	22	23	222	161	38
Feb.	59	43	11	204	146	40
March	70	44	15	178	123	37
Total (3 mos.)	176	109	49	.....	.....	.....
April	46	38	6	188	129	41
May	41	29	10	220	138	39
June	51	39	11	201	109	37
July	46	19	5	198	98	59
Aug.	34	23	4	204	135	26
Sept.	41	28	2	178	118	27
Nov.	35	20	1	152	104	31
Dec.	44	36	4	282	238	27
(1928)	550	367	92	.....	.....	.....
1929						
Jan.	23	6	6	278	251	21
Feb.	23	20	1	339	301	20
March	35	31	4	488	419	24
Total (3 mos.)	81	57	11	.....	.....	.....

Engineers Plan Meeting in Detroit in May

Detroit has been chosen for the place of the national management and materials handling meeting sponsored by the American Society of Mechanical Engineers. The meeting will be conducted May 1-3 with headquarters at the Book-Cadillac hotel. Naturally, recent progress made in the automotive industry will provide much of the material for discussion. Technical sessions are to be held on Wednesday, Thursday and Friday afternoons and Wednesday and Friday evenings. Inspection trips to various automobile and metalworking plants have been arranged for Thursday, Friday and Saturday mornings. A banquet will be served on Thursday evening.

Among the technical papers to be presented at the various technical sessions are the following:

"Management as Applied to Materials Handling," by James Lynah, director of staff, works managers committee, General Motors Corp.
"The Modern Forge Shop," by Hugh Dean, manager of foundry, Chevrolet Motor Co.
"Foundry Handling as a Continuous Process," by L. W. Pardee, Wilson Foundry & Machine Co.
"General Survey of Modern Methods of Production," by John M. Carmody, editor, *Factory and Industrial Management.*
"Management, Layout and Waste of Sheet Metal Shop," by Charles Malpas, Fisher Body Corp.
"Handling of Sheet Metal Stampings," by R. R. Reese, Packard Motor Car Co.
"Body Building," by Vincent Dirkes, Fisher Body Corp.
"Cleaning, Painting and Drying Operations," by O. H. Clausmeyer, Studebaker Corp.
"Machine Shop Methods of Continuous Handling," by J. H. Porter, transmission plant, Chevrolet Motor Co.
"Handling of Miscellaneous Parts," by L. A. Churgay, Chrysler Corp.
"Material Control to Assembly," by Howard Flagg, member of advisory staff, General Motors Corp.
"Operation of the Assembly Line," by Gordon LeFebre, vice president in charge of operation, Oakland Motor Car Co.
"Revolution Now Taking Place in the Glass Industry through Introduction of Automotive Methods," by C. W. Avery, president, Murray Corp. of America.
"Applications to the Electric Industry," by E. L. Spray, Westinghouse Electric & Mfg. Co.
"Applications of Production by Conveyor Methods to Sheet Metal and Enameling," by A. G. Sherman, general manager, Detroit Vapor Stove Co.
"Applications of Production by Conveyor Methods to Molding Operations," by H. M. Lane, president, H. M. Lane Co.

Power of Wages Highest in United States

The American wage earner's economic status not only remains considerably higher than that of his fellows in foreign countries, but the gap between the American and foreign purchasing power of wages, as measured in buying food and shelter in their own countries, has noticeably widened during the past three years, according to the National Industrial Conference board.

An analysis of foreign wages and their purchasing power made by the board on the basis of data collected by the international labor office of the League of Nations at Geneva, discloses that the American wage earner in corresponding trades, in October, 1928, received "real wages," that is wage rates with a purchasing power measured by the prices of food and rent, ranging from one-third to four times higher than workmen in European countries and about one-fifth higher than in Canada.

In each country the data were collected in the chief or a representative industrial city. Below are given the relative position of the purchasing power of foreign wages in the form of index numbers; the Philadelphia worker's "real wage," selected as representative of the American wage, is given as 100 for corresponding months in the three years 1925, 1927 and 1928:

	1925	1927	1928
Philadelphia	100	100	100
Ottawa, Canada	88	85	80
Copenhagen, Denmark	64	55	57
Dublin, Irish Free State	....	58	57
London, Great Britain	53	58	53
Stockholm, Sweden	46	43	46
Amsterdam, Netherlands	46	44	44
Berlin, Germany	35	32	34
Brussels, Belgium	31	28	29
Prague, Czechoslovakia	31	28	26
Vienna, Austria	28	25	25
Warsaw, Poland	28	22	23
Rome, Italy	27	27	22

Convention Calendar

April 15-17—Concrete Reinforcing Steel institute. Fifth annual meeting at Kenilworth Inn, Asheville, N. C. M. A. Beeman, 2112 Tribune Tower, Chicago, is secretary.

April 17-19—National Foreign Trade council. Sixteenth annual convention at Lord Baltimore hotel, Baltimore. O. K. Davis, 1 Hanover Square, New York, is secretary.

April 24-25—American Welding society. Annual meeting at Engineering Societies building, New York. M. M. Kelly, 33 West Thirty-ninth street, is secretary.

April 24-25—National Metal Trades association. Annual convention at Drake hotel, Chicago. J. E. Nyhan, Peoples Gas building, Chicago, is secretary.

April 29-May 3—Chamber of Commerce of the United States. Annual meeting at Chamber of Commerce building, Washington. D. A. Skinner, 1615 H street, N. W., is secretary.

May 1-3—American Society of Mechanical Engineers. National management and materials handling meeting at Book-Cadillac hotel, Detroit. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

May 6-10—American Management association. Annual spring convention at Hotel Pennsylvania, New York. W. J. Donald, 20 Vesey street, New York, is managing director.

May 16-17—National Hardware Association of the United States. Eighteenth annual meeting of metal branch at Hotel Statler, Detroit. George A. Fernley, 505 Arch street, Philadelphia, is secretary.

May 16-18—American Gear Manufacturers' association. Annual meeting at Hotel Statler, Cleveland. T. W. Owen, 3608 Euclid avenue, Cleveland, is secretary.

May 21-22—American Refractories institute. Annual meeting at French Lick Springs hotel, French Lick, Ind. Dorothy A. Texter, 2202 Oliver building, Pittsburgh, is secretary.

May 21-23—American Steel and Heavy Hardware association. Twentieth annual convention at Hotel Washington, Washington. B. R. Sackett, 503 Arch street, Philadelphia, is secretary.

May 24—American Iron and Steel institute. Annual spring meeting at Hotel Commodore, New York. E. A. S. Clarke, 75 West street, New York, is secretary.

May 27-29—American Electrochemical society. Spring meeting at University of Toronto, Toronto, Ont. Dr. Colin G. Fink, Columbia university, New York, is secretary.

Foreign Trade Council Serves 15 Years

When he speaks at the opening session of the sixteenth national foreign trade convention in Baltimore, April 17-19, Secretary of Commerce Robert P. Lamont, will make his first public address since assuming office. Mr. Lamont will discuss the subject, "World Trade, Today and Tomorrow." The National Foreign Trade council, which is sponsoring the meeting at the Lord Baltimore hotel, expects an attendance of over 2000.

Among other speakers at the convention will be: L. A. Downs, president, Illinois Central System; Daniel Willard, president, Baltimore & Ohio railroad; John S. Hambleton, vice president, Pan-American Airways; Senor Don Carlos G. Davila, Chilean ambassador to the United States; Lynn Meekins, United States commercial attache at Ottawa; M. J. Falkenburg, president, Falkenburg Trading Co., Seattle; Prof. G. G. Huebner, University of Pennsylvania; and E. G. Simons, vice president, American Foreign Credit Corp.

Charles M. Schwab, chairman of the board, Bethlehem Steel Corp. and Capt. Robert Dollar, dean of American deep sea shippers, will be speakers at the dinner on April 17. At the closing session of the convention, James A. Farrell, president, United States Steel Corp., will review "Foreign Trade Progress." Mr. Farrell also will observe the council's fifteenth anniversary and his own fifteenth term of service as its service at a special dinner.

Otis To Make More Full Finished Sheets

Otis Steel Co., Cleveland, is increasing the production of full finished sheets by 1000 tons monthly to a total of 10,000 tons monthly. The improvement calls for an expenditure of $200,000, and it includes building of a 91 x 200-foot warehouse for finished sheets, two new cold rolled mills, and the enlarging of two mills to make 63-inch sheets. The change of the sheet mills is in response to a growing demand from automobile producers for increasingly wide autobody sheets. The company also is installing a new water system at a cost of $85,000. The system will supply water for the open-hearth furnaces and mills.

The Chicago office of the Duraloy Co., Pittsburgh, has been moved from 8253 Laflin street to 608 South Dearborn street. Benjamin S. Sklovsky is in charge.

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

BETHLEHEM STEEL CO., and Federal Screw Works, Detroit, have been licensed by the Dardelet Threadlock Corp., 120 Broadway, New York, to manufacture bolts and nuts with lock threads covered by the Dardelet corporation's patents. Negotiations for licensing other companies, for manufacturing for the trade and for their own requirements, are under way. The Dardelet Threadlock Corp. owns the American patents to a threadlock invented by Hugues Dardelet, a French army engineer. It is produced in France by the Societe Francaise de Filetage Indesserrable D. D. G., Paris. In the Dardelet bolt, there is a wide space between the threads, and the surfaces of these spaces form a slight angle with the axis of the bolt. The threads of the nut have a reverse taper. When the nut is drawn tight, the thread on the nut engages the surface of the bolt between the threads, and it is claimed that vibrations tighten the lock.

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AMERICAN LAUNDRY MACHINERY CO., Cincinnati, has purchased the plant and equipment of Schramm Mfg. Co., St. Louis.

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ELECTRO-ALLOYS CO., Elyria, O., has installed a Moore electric furnace to be used for research and production of special castings.

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OGDEN R. ADAMS has opened an office at 407 Cutler building, Rochester, N. Y., for the sale of machine tools.

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COOK-CHAMBERLAIN SUPPLY CO., Oklahoma City, Okla., has been organized to succeed Chamberlain Supply Co., distributor of machinery and industrial equipment.

* * *

J B. FARNUM CO. has purchased the business of the C. H. Darling Co., Woonsocket, R. I., and will operate it as its hardware and mill supply departement.

* * *

JAMES T. CASTLE, Pittsburgh, merchant engineer, has taken a contract from the borough of Etna, Pa., for a boiler of 258 horsepower for its water and light plant. This is a repeat order. He also has sold to Valley hospital, Sewickley, Pa., two 150-horsepower boilers for an addition.

* * *

KANE BOILER WORKS, Galveston, Tex., has added a pipe division and is enlarging its facilities for stocking of pipe for industrial purposes.

* * *

DUKE MFG. CO., St. Louis, manufacturer of restaurant and hotel serving equipment, announces its removal to new plant at 2222 North Ninth street. M. P. Duke is president and general manager.

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GISHOLT MACHINE CO., Madison, Wis., will move its New York offices from 2 Rector street, to 30 Church street, room 702, effective May 1. R. D. Heflin is district manager.

* * *

KULKA IRON & METAL CO., Alliance, O., has bought the plant of the Falcon Tin Plate Co., Canton, O., at sheriff's sale. The property includes 12½ acres. The buyer has not indicated disposition of the plant.

* * *

MACDONALD, HEGEL, MACDONALD INC., Los Angeles, has purchased a plant at Lawrence, Mass., and will start at once manufacturing electric dish washers with an initial force of 100 men.

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NOBLITT SPARKS INDUSTRIES INC., Indianapolis, and Borg-Warner Corp., Chicago, are considering a merger. Stockholders of the former company will vote on the merger shortly. The Noblitt Sparks company operates three plants.

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HARRY G. MASTEN CO., 105 West Monroe street, Chicago, has been appointed Chicago distributor of the Una Welding & Bonding Co., Cleveland, manufacturer of welding machines and welding wire for hand and automatic welding.

* * *

NINETEEN HUNDRED WASHER CO. INC., Binghamton, N. Y., and the Upton Machine Corp., St. Joseph, Mich., manufacturers of washing machines, are considering a merger under the name of the Nineteen Hundred Corp. The plan is for the plant at Binghamton to serve the East and also the Pacific coast by shipment through the Panama canal, while the Michigan company will serve the West. Changes in personnel are not planned.

* * *

OLIVER IRON & STEEL CORP., Pittsburgh, has opened a sales office at 633 Chamber of Commerce building, Cincinnati. Edward G. Hetzel, formerly of the Pittsburgh office, is in charge of this new branch, which will handle business in Kentucky, Ohio and Indiana.

* * *

BARBER-COLMAN CO., Rockford, Ill., has appointed Herberts-Moore Machinery Co., 140 First street, San Francisco, and Herberts Machinery & Supply Co., 401 East Third street, Los Angeles, agents to handle its line of hobs, milling cutters, hobbing machines, and hob sharpening machines in California, Nevada and Arizona.

* * *

BENJAMIN ELECTRIC MFG. CO. has moved its general offices from 120 South Sangamon street, Chicago, to the company's plant at Des Plaines, Ill. The Chicago sales offices now are at 117 South Morgan street, Chicago, where C. B. Harlow, sales manager of the central division, and G. B. Weber, sales manager of the porcelain enameling and stamping division, are located.

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AMERICAN SPIRAL PIPE WORKS, Fourteenth street and Forty-eighth avenue, Chicago, changed its name to the Taylor Forge & Pipe Works, effective March 30. The company, which has been serving the engineering trades since 1900 under the old name, remains unchanged in ownership and capital structure. The change in name is for the convenience of customers who were not wholly familiar with the company's range of products.

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AMERICAN HOIST & DERRICK CO., 63 South Robert street, St. Paul, manufacturer of locomotive cranes, shovel-cranes, hoists and derricks announces the appointment of A. R. Gelinas as its agent for Ontario, Quebec and the Maritime Provinces. His office is in the McRitchie

& Black building, 1434 St. Catherine street, West., Montreal.

* * *

CLEVELAND WHEELBARROW MFG. CO., Cleveland, has bought the former plant of the Bedford China Co., Bedford, O. The tract contains six acres and the plant 45,000 square feet of floor.

* * *

AUBURN AUTOMOBILE CO. has bought the plant of the McFarlan Motor Corp. at Connersville, Ind. Ellis W. Ryan, vice president, is in charge of production at the plants at Connersville.

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STOODY CO., Whittier, Calif., manufacturer of welding supplies, has opened a district sales office at 501 Exchange National Bank building, Tulsa, Okla., in charge of D. F. McCandlish.

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HOLMES FOUNDRY CO., Port Huron, Mich., is reopening its foundry after being idle 18 months, during which time new equipment was installed. The company has a contract for automotive parts for the Ford Motor Co. of Canada.

* * *

AMERICAN MACHINE & FOUNDRY CO., Second avenue and Fifty-sixth street, Brooklyn, N. Y., has purchased the plant and business of American Oven & Machine Co., 615 South California avenue, Chicago.

* * *

ENDICOTT FORGING & MFG. CO., Endicott, N. Y., has bought from the George J. Hagan Co., Pittsburgh, a continuous heat treating and drawing furnace, a car-type annealing furnace, a press, shaper, radial drill and planer.

* * *

W. J. SCHOENBERGER CO., Cleveland, has bought the former plant of the Marvel Equipment Co., Cleveland, and will equip it to manufacture brass gas gages. W. J. Schoenberger is president and J. H. Wolfe is secretary and treasurer.

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BOVEE FURNACE WORKS, 180 Eighth street, Waterloo, Iowa, has been sold to Barnett Schultz. The transaction includes all real estate, buildings, stocks, equipment, fixtures, patterns and tools owned by the company. The firm will continue to operate under the same name.

* * *

BETHLEHEM STEEL CO. has decided to abandon its Moore plant at Elizabethport, N. J., according to announcement by Lafayette Fisher, general manager. He said that the work would be distributed among other plants. About 400 employes are affected.

* * *

MIDLAND ENGINEERING CO. has been formed by bondholders of McMyler Interstate Co., Bedford, Pa., who recently bought in the plant at receiver's sale. The new company will continue the manufacture of tractor cranes, heavy road-building machinery and lighter equipment.

* * *

MICHIGAN ELECTION SUPPLY CO., Dime Bank building, Detroit, recently incorporated, has leased a machine shop at Ypsilanti, Mich., and will proceed with the manufacture of a ballot marker and setter under patents of Eugene Gregory, Detroit. Erection of a plant has not yet been decided.

* * *

NORTON CO., Worcester, Mass., is building a new abrasive crushing mill and an addition to its grain storage building. The former is to be five stories, 60 x 140 feet and the latter three stories, 54 x 117 feet. The new mill will be equipped with crushing, classifying and conveying machinery.

* * *

CHICAGO PNEUMATIC TOOL CO., New York, has appointed the Stearns-Roger Mfg. Co., Denver, its representative in intermountain states. Stocks will be carried in warehouse at Denver, including portable and stationary compressors, rock drills, pneumatic tools and repair parts.

* * *

RALSTON STEEL CAR CO., Columbus, O., has re-elected its officers and directors. Frances E. Symons was continued president, Frank A. Livingston vice president and treasurer, and Leon C. Roy secretary and assistant treasurer. Directors include these three officers and Edmund A. Cole, Edmund P. Kinne, Frank L. Stein and Charles S. Younger.

* * *

INTERNATIONAL COAL CARBONIZATION CO'S plant at the Lukens Steel Co., Coatesville, Pa., is to be the first low temperature coal carbonization plant identified with the steel industry in America. The Lukens Steel Co. has a long term contract for the gas which will be used for heat treating of steel. Approximately 1,750,000 cubic feet of this gas will be made available per day from the new installation.

* * *

PRESSED STEEL TANK CO., West Allis, Wis., has bought the entire interest of the Seamless Steel Products Co., Milwaukee, and will continue its operation as a subsidiary under the name Seamless Steel Products Corp. The Pressed Steel Tank Co. manufactures heavy steel cylinder containers. The Seamless Steel Products Corp. specializes in lighter steel cylinder production. Officers of the latter are: E. J. Lansing, president; J. G. Cowling, vice-president; W. W. Boll, secretary, and Robert Monteith, treasurer. Officers of the Pressed Steel company are: H. O. Brumder, president; George F. Brumder, vice-president; R. P. Dieckelman, vice-president, and F. T. Boundy, treasurer.

* * *

GIDDINGS & LEWIS MACHINE TOOL CO., Fond du Lac, Wis., has passed from control of the Rueping Estate Inc. and Fred J. Rueping to a group headed by H. B. Kraut, vice president and general manager, and associates in the active management. The company has been reorganized and refinanced. The company was founded in 1859 and for 45 years manufactured sawmill and lumber manufacturing machinery exclusively. In 1914 it added a line of horizontal boring, drilling and milling machines and later an internal grinding machine, which later was sold to the Heald Machine Co. Recently it has concentrated on the production of horizontal boring machines. Fred J. Rueping retires to devote his time to other interests.

Pails, Tubs Decline

Washington, April 9.—Production of pails and tubs in February dropped slightly from January, statistics of the department of commerce show. Monthly comparisons follow:

PAILS, TUBS, OTHER WARE

(In dozens)

1928	Production	Shipments	Production	Shipments
Jan.	125,536	149,304	32,678	35,689
Feb.	165,757	162,153	28,513	26,334
March	173,592	175,472	50,904	45,205
April	208,544	201,119	31,545	36,452
May	177,110	155,561	39,206	35,143
June	141,448	144,385	48,038	44,833
July	114,342	121,415	61,688	47,856
Aug.	127,797	142,487	37,846	44,377
Sept.	150,845	139,183	55,850	50,606
Oct.	153,813	152,258	56,469	54,596
Nov.	131,792	103,290	33,553	34,012
Dec.	112,923	102,802	36,042	23,567
Total	1,795,625	1,763,401	515,428	481,421
1929				
Jan.	151,106	165,745	40,649	36,896
Feb.	151,019	170,813	60,471	43,329

Talk Structural Problems

Birmingham, Ala., April 9.—Standardization of specifications on steel, fireproofing standards and further economies through use of "battleship deck" floor construction were discussed at a joint meeting of the American Institute of Steel Construction and the Southern Structural Steel Board of Trades, Monday.

British Pig Iron Market Active

Middlesbrough Exports Increase—Two Cargoes of Low Phosphorus Shipped to America —Hematite Export Comptoir Operating in France—German Billets Unattractive at $29.82, Birmingham—Tin Plate Orders Larger

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, April 9.—(*By Radio*)—Demand for Middlesbrough pig iron continues active, and shipments are heavy, with firm prices. Exports in March amounted to 16,684 tons, a considerable increase over the February rate. The pig iron market in the Midlands also is satisfactory. Barrow and East coast hematite is active. Consumers on the Continent are buying special irons. Two cargoes of low phosphorus iron have been shipped to America.

German billets are being offered at £6 3s ($29.82), Birmingham, but the price is unattractive. The Middlesbrough structural market is strong. The outlook for heavy steel is promising.

The market for tin plate is active, while galvanized sheets are dull. British works recently booked five locomotives for export to the Malay states and two for shipment to Sierra Leone.

In France a hematite export comptoir has been organized and has been operating since April 1. The French iron and steel markets generally are steady. Belgian markets are firm. Fewer orders are being received from China. German exports are improving.

British Steelmakers See Busy Second Quarter

BIRMINGHAM, Eng., March 28.—Markets are quieter this week although there is every prospect the second quarter will open brightly. Demand for pig iron is indicated by lighting of an additional furnace at the Clarence ironworks of Dorman Long & Co. on Middlesbrough iron. The Cargo Fleet Co. has also blown in a furnace on basic iron. Local steelmakers are using most of the iron leaving only small parcels for the open market. The fixed minimum for No. 3 is £3 7s ($16.24) and business may be done at this figure for entire first half. But for delivery after June a premium of £1 10s ($7.27) is demanded. Scarcity of coke

Sterling $4.85

persists and Durham qualities are advancing. It is understood the situation has been relieved by relighting of additional ovens as demand exceeds supply. Mixed numbers have been sold as high as £3 14s ($17.93).

Total output from the 11 furnaces in the Barrow district is being absorbed and some smelters find difficulty in meeting requirements. In the West Cumberland area stocks are limited but in the Furness district they have disappeared. Orders have come in steadily from the Continent while regular shipments are being made to France, Belgium and Germany with some low phosphorus qualities to America. In hematite the position is better than for two or three years both as regards demand and prices. Ferromanganese, which has long been a quiet market, is showing more life.

In the Midland district the position is regarded hopefully, especially in semifinished steel. Billets cost from £6 7s 6d ($30.91) to £6 15s ($32.72) and a brisk buying movement has commenced. The only competitor is Germany.

Staffordshire iron makers are taking a week's holiday. The consuming

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 8	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable								
PIG IRON	£ s d		£ s d		£ s d		£ s d	
Foundry No. 3, Silicon 2.50-3.00	$16.25	3 7 0	$16.98	3 10 0	$16.98	3 10 0	$16.49	3 8 0
Basic	15.76	3 5 0	16.01	3 6 0	16.01	3 6 0	15.76	3 5 0
Basic-bessemer	17.58	3 12 6†	16.01	3 6 0	16.01	3 6 0	15.76	3 5 0
Hematite, Phosphorus 0.02-0.05	17.95	3 14 0	23.66	605*	.....	....	17.46	3 12 0
SEMIFINISHED STEEL								
Billets	$30.92	6 7 6	$25.70	5 6 0	$25.70	5 6 0	$25.22	5 4 0
Wire rods	41.83	8 12 6	30.92	6 7 6	30.92	6 7 6	30.92	6 7 6
FINISHED STEEL								
Standard rails	$37.59	7 15 0	$31.53	6 10 0	$31.53	6 10 0	$32.01	6 12 0
Merchant bars	1.79c	8 5 0	1.35c	6 3 0	1.35c	6 3 0	1.36c	6 4 0
Structural shapes	1.60c	7 7 6	1.11c	5 1 0	1.11c	5 1 0	1.12c	5 2 0
Plates, ship, bridge and tank	1.76c	8 2 6	1.39c	6 6 0	1.39c	6 6 0	1.38c	6 5 0
Sheets, black, 24 gage	2.28c	10 10 0	2.26c	10 5 0	2.26c	10 5 0	2.50c	11 7 0
Sheets, galvanized, 24 gage, corrugated	2.90c	13 7 6	3.01c	13 13 9	3.01c	13 13 9	3.43c	15 12 0
Bands and strips	2.17c	10 0 0	1.40c	6 7 6	1.40c	6 7 6	1.40c	6 7 6
Plain wire, base	2.06c	9 10 0	1.71c	7 15 0	1.71c	7 15 0	1.71c	7 15 0
Galvanized wire, base	2.93c	13 10 0	2.17c	9 17 6	2.17c	9 17 6	2.20c	10 0 0
Wire nails, base	2.39c	11 0 0	1.80c	8 3 9	1.80c	8 3 9	1.76c	8 0 0
Tin plate, base box 108 pounds	$ 4.37	0 18 0	.....	.....	.....	....	$ 6.79	1 8 0
*France								
Domestic Prices at Works or Furnace—Last Reported			Francs		Francs		Marks	
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$16.25	3 7 0	$18.57	475(2)	$16.82	605	$18.50	78
Basic pig iron	15.76	3 5 0	19.94	510(1)	16.96	610	20.87	88
Furnace coke	3.52	0 14 6	5.87	150	5.56	200	5.10	21.50
Billets	30.92	6 7 6	23.07	590	25.99	935	28.70	121
Standard rails	1.79c	8 5 0	1.46c	810	1.63c	1,250	1.51c	140
Merchant bars	1.79c	8 5 0	1.36c	755	1.41c	1,085	1.52c	141
Shapes	1.71c	7 17 6	1.26c	700	1.22c	940	1.49c	138
Plates, ship, bridge and tank	1.87c	8 12 6‡	1.54c	855	1.46c	1,125	1.71c	158
Sheets, black, 24-gage	2.28c	10 10 0	2.92c	1,620	2.70c	2,080	2.43c	225
Sheets, galvanized 24 gage, corrugated	2.93c	13 10 0	3.69c	2,050	3.84c	2,950	3.78c	350
Plain wire	2.06c	9 10 0	1.89c	1,050	2.08c	1,600	2.48c	230
Bands and Strips	2.17c	10 0 0	1.51c	840	1.76c	1,350	1.77c	164

*Middlesbrough; †Scotch foundry iron; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 15s 0d ($3.64) f. o. b. Ferromanganese £21 13s, 0d ($105.00) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($72.75) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

works are closing down and although marked bar mills could continue they do not relish the idea of creating stocks.

Tin plate buyers have become nervous as to prices in view of steady rise in production costs. Steel bars are rapidly appreciating while steel scrap is scarce with prices about 15s ($3.63) higher than last summer. Consequently after a dull period extending over many months tin plate makers are receiving orders and inquiries from nearly all the world's markets. It is evident that an increase is imminent and consumers are anxious to get in on the present basis of 18s 3d ($4.43). This of course is the minimum and business has actually been done up to 18s 6d ($4.49). Plates have been sold for shipment to the end of the year.

Heavy steel prices are unchanged, but there is a feeling that advances are likely in the second quarter in view of the increasing cost of raw and semifinished material. Cleveland mills could handle a good deal more work, especially in ship plates and sections, although the volume is much heavier than last year. Structural steel is in fairly good demand on the northeast coast, but the Midlands at present require little.

Buying of pig iron on the Birmingham Exchange today was confined to small lots for urgent delivery.

Japan Doubles Output

A significant development in Japan's recent economic history has been the growth of her steel industry, according to an analysis of iron and steel production in that country just issued by the commerce department. This growth, it is pointed out, could not have taken place except under the peculiar economic system under which the government is in a position to foster the expansion of industries despite natural or economic disadvantages.

Production of steel by Japanese mills is well in excess of 1,500,000 tons annually, approximately double that of 1920. Moreover, Japanese plants are being enlarged and improved, an indication that producers believe that natural obstacles can be overcome and that continuance of government support can be relied on, says the department's report.

In view of the importance of Japan as a market for foreign steel, the expansion of the domestic industry is of peculiar importance to steel interests in the United States, Great Britain and Germany, all of which find in this country an important outlet for their products.

Belgian Steel Market Active as Conditions Are Better Defined

BRUSSELS, March 22.—(*European Staff Service*)—Greater activity was evident at the last meeting of the Brussels iron and steel exchange, partly as a consequence of the awakening of home demand, partly because German works again were on the market, and partly as a result of the favorable conclusion of the meeting of the international rail manufacturers' association. For many months the Germans were not sellers on the export markets, due to the lockout during October and November, and also to the cold weather, which prevented transportation on the Rhine. However, everything now is settled and there are heavy tonnages to be sold. In order to facilitate sales, German mills are accepting small sections and special profiles at reasonable prices for delivery within a short period. It was said that German steel bars (rounds) were quoted at £6 5s ($30.30) some weeks ago, whereas German offers for flat bars still are on the market at about £6 3s 3d ($29.94) f.o.b. port of shipment, the date of delivery being April-May. Domestic demand is becoming brighter, but the French home market is slackening. Nevertheless, French offers were not numerous, as commitments of producers of that country are heavy.

The meeting of the international rail manufacturers' association was held last week. Difficult questions had to be solved, particularly that relating to the renewal of the agreement. Up to the present time it is known only that the agreement has been renewed for six years. This important decision was satisfactorily interpreted at the meeting of the Brussels exchange. South American buying remains important. With regard to Great Britain, there is much more confidence in the strength of that country's steel market. Costs of production are advancing, thus opening up prospects of better business with British transformers.

Under these conditions the Belgian market is firm. The general volume of business has not yet become sensibly heavier, but inquiries are more numerous and certain makers who a week ago underquoted prices have disappeared from the market. Basic bessemer pig iron is worth £3 6s ($15.99) f.o.b. Antwerp. Billets are sold chiefly by German makers. Under these circumstances, prices are difficult to test. Sheet bars are quoted at £5 6s ($25.69), and there again makers are refusing orders below £5 6s ($25.69). Six-inch blooms are £4 17s ($23.48) and 4 to 4½-inch blooms are £5 2s ($24.73). The price of slabs of an equal section is £5 3s ($24.97) for 200 x 50 millimeters section. Bars are sold at £6 3s 6d ($29.94). Beams, normal profile, are quoted at from £5 0s 6d ($24.37) to £5 1s ($24.49), and British sizes at £5 3s ($24.97).

Krupps' New Pipe Mill Project May Disrupt Trade Associations

BERLIN, March 22.—(*European Staff Service*)—The question whether it will be possible to cause Krupps to abandon the planned construction of a pipe rolling mill has become of great importance to the German iron and steel situation. The Vereinigte Stahlwerke, the leading German producer, stated that for its policy only one alternative existed: the continuation of all or of none of the various producers' associations.

As it cannot be doubted that the establishment of a pipe rolling mill by Krupps would mean the dissolution of the pipe association, the importance of this step for the whole of the German iron and steel market can be judged. The present negotiations between Krupps on the one hand and the Vereinigte Stahlwerke and Mannesmann as the leading pipe producers on the other, have not been successful so far, and it is understood the differences are considerable. For the time being it cannot, of course, be said whether these difficulties will finally be overcome, but in the meantime the situation remains unsettled.

To indemnify German producers for loss sustained during the last quarter of 1928 as a result of the lockout, the German export quota of iron and steel was increased for the first quarter of 1929 by 5 per cent. For the second quarter of 1929 a further advance of the monthly export quota from 300,000 metric tons to 330,000 tons has been decided upon, but German producers claim that even this tonnage is insufficient. As a matter of fact, German production at present is exceeding the allotted quota.

Export sales have improved of late, although the advance progresses slowly. Foreign buyers are not active. Nevertheless, quotations could be raised. Merchant bars are quoted at about £6 4s ($30.06) and structural shapes at £5 2s ($24.73). Ship plates have made a better showing. Light and medium sheets, on the other hand, have been depressed, and the same is true in regard to wire, quotations for wire products having had to be cut by about 2s 6d (60c). The export price of plain wire now is £7 15s ($37.55); galvanized wire, £10 ($48.50); barbed wire, £12 7s 6d ($60); annealed wire, £8 5s ($40). Wire nails are £8 ($38.80). Rail quotations have been advanced to £6 10s ($31.50) for the Far East, £6 15s ($32.70) for Europe, and £6 12s ($31.98) for all other countries.

On the domestic market a better tone has been registered, as a revival of business is expected to result from termination of cold weather and from increased orders to be booked from a revival of building activities. So far, however, the building trade still is reluctant, hampered by financial difficulties. On the other hand, railroads will be placing orders aggregating about 100,000,000 marks with the German car and locomotive makers.

The pig iron producers, contrary to expectations, have not decided on an increase of quotations, but it is believed that at the next meeting of the pig iron association such a decision will be taken. Sales declined from 132,000 metric tons in January to 116,000 tons in February.

CONSTRUCTION and ENTERPRISE

Concise Timely Business Building Opportunities from Field of Industry

East Central

CHICAGO—American Electric Fusion Corp. has awarded the contract for a 2-story plant and office building addition, 40 x 130 feet, to Moraw & Owens.

EAST ST. LOUIS, ILL.—Mobile & Ohio railroad has awarded to the Ellington-Miller Co., Chicago, the general contract for roundhouse and other facilities at Cahokia yard, near here. Included will be a 16-stall reinforced concrete and brick roundhouse, boiler and power house, locker building, 100-foot turntable, sand house, coal conveyor, and yard offices.

ROCKFORD, ILL.—Rockford Organ Co. plans to install power equipment in its new pipe organ manufacturing plant. Peterson & Johnson are architects.

EAST CHICAGO, IND.—City soon will award the contract for the construction of waterworks improvements including a pumping station, mains, etc.

EVANSVILLE, IND.—Evansville Malleable Castings Co., 2549 East Colm street, plans the construction of a 1-story foundry building. L. P. Edwards is manager.

DETROIT—Hupp Motor Car Co., 3641 East Milwaukee avenue, has awarded the contract for structural steel for a building at Cleveland to J. E. Moss Iron Works Co.

LANSING, MICH.—Olds Motor Works has let the structural steel contract for a building to Jarvis Engineering Co.

LANSING, MICH.—City of Lansing, department of water and electric light, O. E. Eckert superintendent, plans the construction of a power plant addition. J. E. Woodell, 501 Fifth avenue, New York, is engineer.

MARQUETTE, MICH.—E. J. Longyear Co., Michigan and Walnut streets, manufacturing diamond drills, etc., has broken ground for an extensive addition to its plant.

MARQUETTE, MICH.—Duluth, South Shore & Atlantic railroad is reported to be contemplating early replacement of its wooden ore dock here with a modern new dock. Preliminary harbor and land surveys have been completed for the new structure, which will be longer and about 10 feet higher than the old one. The approach also will be rebuilt. The work is to be finished in two years.

CLEVELAND—Cedar Foundry & Mfg. Co. has leased a building at 2167 East Fifty-fifth street for a plant.

CLEVELAND—Cleveland Heater Co., 1900 West 112th street, has started work on its plant addition, for which the contract has been let to Superbilt Construction Co.

CLEVELAND—Electric Vacuum Cleaner Co., 1734 Ivanhoe road, has let the contract for the construction of a plant addition to J. L. Hunting Co. and has work under way.

CLEVELAND—Work has started on the plant extension for the Metal Equipment Co., 2035 West 106th street. Mitzel Co. is general contractor.

CLEVELAND—Clark Controller Co., 1146 East 152nd street, advises that it has awarded the contract for the construction of an addition to its present plant to take care of increased business.

TIPPECANOE CITY, O.—City plans to vote on bonds for the construction of an addition to the municipal electric power and water pumping plant.

NEWELL, W. VA.—Homer Laughlin China Co. will install power equipment in its proposed new plant unit.

MADISON, WIS.—Wisconsin Power & Light Co., 16 North Carroll street, will build a storeroom and garage at Beaver Dam, Wis., and a similar unit at De Forest, Wis. The architects are Balch & Lippert, Madison. E. J. Kallevang is chief engineer.

MILWAUKEE—Layton Park Motor Co., Twentieth and Forest home avenues, is building a shop and service floor extension, 69 x 129 feet.

MILWAUKEE—A. O. Smith Corp. has awarded the contract for structural steel for two welded pipe shops and a crane runway to Wisconsin Bridge & Iron Co.

MILWAUKEE—Milwaukee Forge & Machine Co., 340 East Oklahoma avenue, is building a shop addition, 73 x 180 feet, and making extensive alterations in the present shops to gain capacity.

MILWAUKEE—The Milwaukee board of school directors is taking bids until April 25 for the construction of two additional stories to its service building, 180 x 180 feet, at Eleventh street and Highland avenue. G. E. Wiley is school board architect.

MILWAUKEE—Wisconsin Gray Iron Foundry Co., Thirty-ninth avenue and Burnham street, has increased its authorized capitalization from $30,000 to $250,000 to accommodate the growth of its business. Leo. A. Mullaney is secretary.

MILWAUKEE—St. Paul Avenue Building Co., care of Architects Dick & Bauer, 208 Third street, is awarding contracts for the erection of a 1-story shop, 50 x 175 feet, with basement. with a 2-story section for drafting room, office, etc. The name of the occupant is withheld for the present.

OSHKOSH, WIS.—Foster-Lothman Mills, Fourth and Minnesota street, manufacturing lumber, sash, doors, etc., is having a power survey made by Chas. A. Cahill & Sons, engineers, 214 Mason street, Milwaukee, with a view of increasing the steam generating capacity. No estimates of cost are as yet available.

RACINE, WIS.—Modine Mfg. Co., radiators and cooling systems for gasoline and oil engines, copper radiation, etc., has acquired another 3-story unit of the former American Seating Co. works and will convert it into a plant addition. A. B. Modine is president and general manager.

RACINE, WIS.—Work has been started by the Nash Motors Co., Kenosha, Wis., on a new foundry unit 100 x 250 feet, at the Racine Works, Seventeenth and Packard avenues. Inquiry is being made for two cranes and other

(*Continued on Page* 1043)

Resale Equipment News

PLANT of the Massillon Power Shovel Co., Massillon, O., will be sold at auction April 17 by Herbert Action Segal & Co., auctioneers. The site consists of five acres and the main plant building has 30,000 square feet of floor space, with 40-ton traveling crane. There is an office building, boiler, pattern, blacksmith shops and other buildings.

* * *

Land, buildings, machinery and equipment of the Sykes Co. Inc., Logansport, Ind., will be sold at public auction April 18 by Industrial Plants Corp. The plant is equipped for the manufacture of rolled and drawn metal moldings, metal doors and frames, steel concrete forms and similar products. Machinery includes brakes, shears, punches, shapers, welders, grinders, lathes, millers, drills and numerous other similar tools.

Sales Calendar

April 17—*Auction sale of surveyed material at Philadelphia navy yard.*

April 17.—*Plant of Massillon Power Shovel Co., Massillon, O., to be sold at public auction.*

April 18.—*Land, buildings, machinery, etc., of Sykes Co. Inc., Logansport, Ind., to be sold at public auction.*

Machinery

Increase in Price of Motors Strengthens Machine Tool Situation—Inquiry Unchanged —Carry-Over Heavy

MISCELLANEOUS business continues to be placed in substantial volume in the eastern market. Sellers regard the market situation as satisfactory in view of the fact that practically all important branches of industry are patronizing the market. A firm price trend in the machine tool market is mirrored by the advancement in the price of motors. Business in the Pittsburgh district is reported steady with a few large awards having been placed. In the Middle West inquiry and sales are on the same basis as maintained in the first week of March. Shipments last month were made at a high rate despite lengthened deliveries. The carry-over into April is heavier than at any previous time. Orders and inquiries continue on a diversified basis.

New York, April 9.—While few outstanding awards are noted, a substantial volume of miscellaneous business continues to be placed in the local machine tool market. Demand is coming out from practically all important branches of industry, a situation which sellers regard as particularly satisfactory. Intertype Co., Brooklyn, N. Y., noted in a recent issue as inquiring for approximately 30 machine tools in addition to a considerable number of other miscellaneous items of equipment, has closed on approximately 10 machine tools. General Electric Co., Schenectady, N. Y., continues an important factor, although not buying on the scale recently noted. An inquiry for about 50 machining tools is expected to be issued shortly by the Delaware, Lackawanna & Western.

A feature of the week's news is advances of 12½ and 15 per cent in the prices of motors. This and several other factors are contributing to a strong price situation in machine tools. A new England builder of shapers has advanced prices 10 per cent.

Crane buying is featured by the placing of 10 electric overhead cranes and two charging machines by Nichols Copper Co., Laurel Hill, L. I., for installation at El Paso, Tex.

Pittsburgh, April 9.—Machinery sellers report a steady flow of business with few large awards. The total volume of business shows a slight increase over the lull prevailing during February. Inquiry is in good volume. Inquiry for cranes is fairly active and although considerable work is pending, awards are deferred. The recent price increase in motors has involved some revisions on previous quotations.

Chicago, April 9.—Machine tool inquiries and sales are at about the level of the first week in March. Some houses report that March sales were a record, exceeding even war years. For the district as a whole the volume of business apparently did not set a new mark but surpassed last March. Despite lengthened deliveries in machine tools, March shipments were at a high rate, exceeding both February, and March, 1928. The carry-over into April, however, probably is heavier than at any previous time. Inquiries have become active in Milwaukee territory. A. O. Smith Corp. is ordering some special equipment, and will purchase a more general line of tools later, it is stated. Orders and inquiries are more widely diversified than a year ago, and sales in the Chicago district the past week reflected demand from virtually all industrial lines. Chicago & North Western is inquiring for two 16-inch lathes, and Chicago, Burlington & Quincy for an 18-inch lathe. Rock Island, in addition to other tools on inquiry, is asking bids on a combination punch and shear. Chicago board of education has taken bids on woodworking tools for the Graham, Franklin, Cregier and Manley junior high schools. Dealers have received notice of a 12½ to 15 per cent increase on various-sized motors from leading manufacturers. No further details have been heard concerning the probable 10 per cent advance on shapers, milling machines and radial drills.

Cleveland, April 9.—Orders for machine tools are at the same level as a week ago. The situation is considered satisfactory. No let-up is anticipated by the trade during this month. Most commitments still are for single tools for replacement. Despite efforts of machine tool builders to supply demand, delivery continues to be a problem and unfilled orders continue to mount. A shortage of used equipment exists and dealers are meeting with difficulty in their endeavor to fulfill requirements. Sales still are scattered.

Announces Open House

One of the many features in connection with the second annual open house to be held by the Case School of Applied Science, Cleveland, Friday, April 12, will be an operating display of cameras, microscopes and other photomicrographic equipment recently acquired by the college. The display will be sponsored by the department of mining and metallurgy which will have also on exhibition experimental electric furnaces, pyrometry equipment and other heat treating accessories. All departments of the college will be open to the public from 2 to 5 p. m. and from 7 to 10 p. m.

CRANE ORDERS PLACED

Ten electric overhead cranes, 5 to 15 tons capacity, for Nichols Copper Co., Laurel Hill, L. I., for installation at El Paso, Tex., to Milwaukee Electric Crane & Mfg. Co.; also two 7½-ton charging machines for El Paso to Morgan Engineering Co.; two or three heavier capacity overhead cranes to be placed later.

25-ton electric crane, 57½-foot span, for Lackawanna railroad, to Shaw Crane-Putnam Machine Co.

15-ton double cantilever gantry, with 5-ton auxiliary hoist, 105-foot cantilever arms 21 and 33 feet, for Missouri Pacific railroad shops at Sedalia, Mo., to Manning, Maxwell & Moore Inc.

CRANE ORDERS PENDING

Used crawler steam shovel for Iron Mountain Gravel Co., Whelen Springs, Ark.

Advances Motor Prices

New York, April 9.—General Electric Co., Schenectady, N. Y., has announced an increase of 12½ and 15 per cent in its prices on motors, effective immediately.

Enameled Ware Is Off

Washington, April 9.—February shipments of enameled sheet metal ware dropped sharply, according to the department of commerce statistics. Monthly comparisons follow:

In dozens

1928	Total	White	Gray	Colored
Jan.	319,871	155,172	132,136	32,563
Feb.	372,848	179,794	131,485	61,569
March	442,689	200,010	152,895	89,784
April	351,034	143,470	123,808	83,756
May	348,661	158,458	116,541	73,662
June	299,078	141,486	95,959	61,633
July	277,684	125,653	108,584	43,447
Aug.	358,811	164,580	134,191	60,040
Sept.	352,484	172,127	130,337	50,020
Oct.	417,387	190,424	166,078	60,885
Nov.	328,875	139,197	123,850	65,828
Dec.	324,445	132,422	136,170	55,853
Tot., 1928	*4,191,761	*1,900,275	1,552,034	*739,452
1929				
Jan.*	427,871	199,589	138,480	89,802
Feb.	390,577	178,589	131,206	80,782

*Revised.

Japanese Bid Scrap Up

New York, April 9.—Exporters of scrap find it difficult to obtain tonnages in the East because of higher domestic prices and efforts of Japanese steamship lines to obtain westbound cargoes for their vessels sailing from Gulf ports. With the movement in cotton light, Japanese ships accept scrap for Japan at low rates. From Gulf ports to Kobe the rate is $5 per gross ton, including loading and unloading and Panama Canal tolls. Texas scrap dealers have refused offers of $12.50, f.a.s. Houston, Tex., for No. 1 heavy melting steel for shipment to Europe.

Construction and Enterprise

(*Continued from Page* 1041)

equipment. D. M. Averill is general manager at Racine.

RACINE, WIS.—Peerless Motors, 1615 Racine street, have started work on the erection of an addition to be equipped as a machine shop and service floor.

STEVENS POINT, WIS.—Freeman Mfg. Co., Racine, Wis., is low bidder on three marine type boilers which are to be installed in the new heating plant of the State Teachers' college.

WAUKESHA, WIS.—M. Shober, 433 West College avenue, will build a garage and repair-shop, 40 x 60 feet, 2-story, at 261 West Main street.

Southern States

BERRYVILLE, ARK.—Southwestern Gas & Electric Co., Shreveport, La., plans to install a transformer station and is constructing an electric line from Harrison to here.

FAYETTEVILLE, ARK.—City has purchased a 78-acre site and will build an airport.

TEXARKANA, ARK.—Southwestern Transportation Co. plans construction of shop buildings.

ST. PETERSBURG, FLA.—A. V. Trotter, San Diego, Calif., is contemplating the establishment of an airplane manufacturing plant here.

ATLANTA, GA.—George H. Pruden, San Diego, Calif., and Edward Whitehead, Los Angeles, are negotiating for a site for an airplane manufacturing plant. Parts for tri-motor all metal plane will be produced also.

LOUISVILLE, KY.—Kentucky Electric Development Co., Breslin building, plans the construction of two small hydroelectric power plants, one in Pulaski county and one at Mill Springs, Wayne county.

BEATTYVILLE, KY.—Power plant of the Kentucky-Tennessee Light & Power Co. was damaged in a recent fire.

BATON ROUGE, LA.—Engineering Research & Equipment Co., Los Angeles, has been awarded contract for construction of a combination absorption and compression gasoline plant to operate on refinery gases. Standard Oil Co. of Louisiana is owner.

NEW ORLEANS—Menefee Airways Inc., 2111 Burgundy street, J. C. Menefee president, plans improvements at its airport near here, to include the erection of a hangar, tool house, etc.

SHREVEPORT, LA.—Southwestern Gas & Electric Co. has let contract to Werner Co. for construction of a 1-story transformer station.

SHREVEPORT, LA.—Superior Iron Works has increased capital stock from $25,000 to $75,000 to provide for extensions. R. N. Poindexter is general manager.

PONCA CITY, OKLA.—Oklahoma Gas & Electric Co. has started construction of a 15,000-kilowatt generating station on the Arkansas river near here. Two high voltage transmission lines will connect the new plant with other company properties at Enid, Okla. Fred Wertz is in charge of construction. All equipment has been purchased.

SEMINOLE, OKLA.—Gypsy Oil Co. and other operators in the Seminole field have announced their intention of using electric power in certain gasoline plants in the field. Most of the concerns plan to generate their own power for operation of the plants. S. G. Sanderson is in charge of gasoline plants for Gypsy Oil Co.

TULSA, OKLA.—H. F. Wilcox, president Wilcox Oil & Gas Co., with associates, plans manufacture of airplanes of a special type. Detailed plans are yet immature.

TULSA, OKLA.—General Oil Tool Co. of Los Angeles, with oil tool repair shop at Seminole, Okla., has increased its capital in Oklahoma from $25,000 to $75,000. Oklahoma headquarters are in the Philtower building.

TULSA, OKLA.—Protective Metals Inc., W. E. McCandlish, 221 East Archer street, general manager, will build a plating plant on Sand Springs road for cadmium and chromium plating of oil field equipment, etc. Present plans call for construction of a 2-story brick building with 10,000 square feet floor space.

SPARTANSBURG, S. C.—A. M. Jamison Tobacco & Cigar Co. plans to install power equipment in rebuilding of part of plant burned recently.

COPPER HILL, TENN.—Structural steel for a plant addition for Tennessee Copper Co. has been awarded to Ingalls Iron Works.

ELIZABETHTON, TENN.—Watauga Steel & Construction Co., plans to establish a steel plant on the Thomas farm site.

AUSTIN, TEX.—Board of regents, University of Texas, announces the construction of a new mechanical engineering building to house a woodworking machine shop and foundry divisions. Herbert M. Greene, Santa Fe Bldg., Dallas, Tex., is architect.

CISCO, TEX.—Superior Refining Co. is building an oil refinery of 500 barrels daily capacity on site of old Pioneer Oil & Refining Co. plant.

HOUSTON, TEX.—Reed Roller Bit Co., Mack street and Navigation boulevard, W. L. Childs vice president and general manager, has awarded the contract for an addition to its plant to Houston Construction Co. Henry H. Tates has the contract for a 2-story office building.

HOUSTON, TEX.—Texas Electric Steel Castings Co., F. A. Kroll general manager, has completed new main plant building, 128 x 240 feet, and is building a pattern storage shop, 40 x 80 feet, and warehouse, 40 x 80 feet. Plans have been made for a separate laboratory building.

RANGER, TEX.—Tank car shop of Chestnut & Smith Corp. was damaged by fire recently.

SANDERSON, TEX.—Texas-Louisiana Power Co., Ft. Worth Club building, Ft. Worth, Tex., plans to rebuild the burned part of its plant.

CLIFTON FORGE, VA.—Chesapeake & Ohio railroad, Richmond, Va., has awarded the contract for the construction of an engine house and shop facilities to John W. Cowper Co. Inc., State-Planters Bank building, Richmond. (Noted March 21.)

North Atlantic

BRISTOL, CONN.—Wallace Barnes Co., Main street, plans the installation of power equipment in its two new wire mill additions.

BRIDGWATER, MASS.—Contract for structural steel for the construction of a powerhouse for the state sanitarium has been awarded to Eastern Bridge & Construction Co.

CAMBRIDGE, MASS.—Boston Elevated railroad, Park square, Boston, has awarded the contract for the construction of a substation at Boylston and Elliott streets, to E. E. Munroe, 536 Harrison avenue, Boston.

CLINTON, MASS.—Wickwire-Spencer Steel Corp., here will install a new galvanizing plant.

WORCESTER, MASS.—Operations have been started on the construction of a new 5-story abrasive crushing mill 60 x 140 feet and an addition to the grain storage building, 3-story, 54 x 117 feet, at the Norton Co. plant here. Construction is planned for completion by July 1.

RALSTON, N. H.—Maine & New Hampshire Granite Corp. plans to rebuild its power house and cutting department unit damaged in a recent fire.

CAMDEN, N. J.—Rundle Mfg. Co., Twenty-seventh and Cleveland avenues, Milwaukee, has awarded the general contract for the construction of a group of buildings, including foundry, etc., to Barclay, White & Co., 22 North Thirty-sixth street, Philadelphia. (Noted March 28.)

NEWARK, N. J.—Hanovia Chemical Mfg. Co., manufacturer of precious metal products, has acquired a square block, bounded by Mulberry, Chestnut and Oliver street. Property comprises seven industrial parcels, including a 30 x 100-foot, 3-story building owned by Morris Machine Co. Plans for the future development of the property will be announced later. Charles Engelhard is president.

BROOKLYN, N. Y.—Segal Lock & Hardware Co., 55 Ferris street, has awarded a contract to Lockwood, Greene & Co. for the erection of an iron foundry on property adjoining its main plant.

CONKLINVILLE, N. Y.—Mohawk Hudson Power Corp., 126 State street, Albany, N. Y.,

plans the construction of a power house here.

POUGHKEEPSIE, N. Y.—De Laval Separator Co., will take bids in about 30 days for 1 and 2-story foundry additions. S. H. Chadwick, 140 Cedar street, New York, is the consulting engineer.

NEW CASTLE, PA.—Pennsylvania Power Co., care of Stevens & Wood, 20 Pine street, New York, engineers, plans the construction of an outdoor substation here.

LANCASTER, PA.—Hubley Mfg. Co., manufacturer of cast iron toys, is preparing plans for the erection of a foundry addition.

PHILADELPHIA—Structural steel for the construction of a building for Edgecomb Steel Co., Eleventh and Cambria streets, has been awarded to the Jones & Laughlin Steel Corp.

PHILADELPHIA—A. Atwater Kent Mfg. Co., Wissa avenue and Abbotsford road, has awarded the contract for reinforcing bars for a power house to Kalman Steel Co.

West Central

DENVER—City and county has awarded the contract for the construction of a court house, including a boiler house, on Brunswick avenue, to Varnum & Bate, 2311 Tenth street.

PUEBLO, COLO.—Colorado Interstate Gas Co., Denver, plans the construction of a natural gas booster station near here. Ford, Bacon & Davis, 39 Broadway, New York, are engineers.

SALIDA, COLO.—Public Service Co. of Colorado, Denver, plans the construction of a hydroelectric development on Foose creek, including two dams, power generating equipment, etc.

DODGE CITY, KANS.—International Harvester Co., 606 South Michigan avenue, Chicago, has awarded the contract for structural steel for a building to Pittsburgh-Des Moines Steel Co.

WICHITA, KANS.—Travel-Air Co. is considering the construction of a plant for the manufacture of airplanes at St. Petersburg, Fla.

WICHITA, KANS.—Stearman Aircraft Co., 601 East Thirty-fifth street, has awarded a general contract to the Henrion Improvement Co., Schweiter building, for a 1-story and basement foundry addition, 55 x 125 feet. (Noted Feb. 7.)

INDEPENDENCE, MO.—Independence Stove & Furnace Co., 700 South Cottage street, has awarded the contract for the construction of a 1-story enameling plant addition, 65 x 120 feet, to L. W. Weeks, 633 South Fuller street.

MARSHALL, MO.—Nicholas-Beazley Airplane Co. Inc. plans the construction of an airplane manufacturing plant addition, 50 x 150 feet.

ST. LOUIS—St. Louis-San Francisco railroad, Frisco building, plans the erection of a 1-story engine house.

Western States

EMERYVILLE, CALIF.—Westinghouse Electric Co., East Pittsburgh, Pa., has let the contract for reinforcing bars for a plant to Soule Steel Co.

LOS ANGELES—Pacific Electric railroad plans to add to Toluca power substation on Glendale boulevard.

JOSEPH, OREG.—Pacific Power & Light Co., Gasco building, Portland, Oreg., S. W. Talbot president, plans the construction of a power plant on Wallowa lake here. H. H. Schoolfield is engineer.

MARSHFIELD, OREG.—Work will start immediately on construction of 60 miles of 110,000 volt electric transmission line from Dixonville to Coos Bay by the California-Oregon Power Co. and Mountain States Power Co. A new 12,000-horsepower boiler is also being installed in the power plant here.

ABERDEEN, WASH.—Twin City Foundry Co., recently incorporated with $20,000 capital plans construction of a frame foundry plant at 420 South G. street. Incorporators are Walter Christian, Warren Scott, William Fireminger and G. H. Allison.

Canada

EDMONTON, ALTA.—Waterous Ltd., Brantford, Ont., manufacturer of pulp mill equipment, boilers, engines, woodworking machinery, etc., has purchased the plant and property of the Edmonton Iron Works here and will alter and re-equip the plant. The company takes immediate possession.

DALHOUSIE, N. B.—Town council plans additions and installation of new equipment to electric light plant here.

SIDNEY, N. S.—British Empire Steel Corp. is contemplating the construction of a powdered coal process power plant here.

COPPER CLIFF, ONT.—Ontario Refinery Co. is considering plans for the erection of a large copper refinery here.

HAMILTON, ONT.—Burlington Steel Corp. has awarded contracts for a new building in connection with its plant here including general contract to W. H. Cooper, 6 Hughson street. Steel contract has been awarded to the Hamilton Bridge Co.

HARROW, ONT.—Town council is contemplating the installation and construction of waterworks plant and system here. R. C. Flood is clerk.

KITCHENER, ONT.—Interior Hardware Co., Wilmot street, has awarded a number of contracts in connection with the addition to its plant here.

LONDON, ONT.—Canadian Richards Wilcox Co., Chelsea Green, has let contract to John Hayman & Sons, 433 Wellington street, for the erection of a plant addition. Machinery will be purchased.

MT. DENNIS, ONT.—Ferranti Electric Co., 26 Noble street, Toronto, Ont., recently announced its intention to establish a new manufacturing plant. In this connection it has secured a site here and appointed Ewart, Armer & Byam Ltd. architects and engineers, to prepare plans. (Noted March 7.)

OJIBWAY, ONT.—Canadian Steel Corp. is making arrangements for the erection of a plant addition here.

PENETANGUISHENE, ONT.—Dominion Stove & Foundry Co. is contemplating the erection of an addition to its plant here.

ST. CATHERINES, ONT.—General Motors of Canada Ltd., Oshawa, Ont., which recently acquired the plants of the McKinnon Industries here, proposes to enlarge the works and install new machinery, tools, etc.

SUDBURY, ONT.—A company in which the Consolidated Mining & Smelting Co., the International Nickel Co., Ventures Ltd. and the Sherritt-Gordon Co. are interested is applying for incorporation at the provincial legislature, Toronto, Ont. The object of the company is to build a copper refinery and electrolytic zinc reduction works in this district. Engineers are working on the first unit on which construction work will be started as soon as plans have been completed. It is the intention to have the plant completed and in operation within eighteen months with a capacity of 10,000 tons per month.

TORONTO, ONT.—Toronto Iron Works Ltd., has applied for a permit for the erection of a plant on Eastern avenue.

WALKERVILLE, ONT.—In connection with the unit of the Chrysler Motor Co., under construction here, additional contracts have just been awarded including ovens to Whitehead & Kales Co., Detroit; and monorails to T. Eansor & Sons, Pitt street, Windsor. (Noted March 21.)

GRAND 'MERE, QUE.—Fairchild Aviation Co. Ltd. will build a mill here.

LONGUEUIL, QUE.—Fairchild Aviation Co. Ltd., Grand 'Mere, Que., has purchased a site here and will erect a manufacturing plant. Ellwood Wilson is president.

New Construction and Enterprise

Recent Incorporations

CHICAGO—B. & K. Mfg. Co., 1331 West Jackson boulevard, has been incorporated with $5000 capital to manufacture and deal in machine products by Sam Klinsky.

CHICAGO—Llyds Mfg. Co., 1500 South Western avenue, has been incorporated with $50,000 capital to manufacture and deal in automotive and electrical specialties, by Harvey S. Knight.

LAKE CHARLES, LA.—Lake Charles Welding & Machine Works has been incorporated by Thomas J. Clooney and Everett Praut, secretary.

BOSTON—Houston & Flagg Co. has been incorporated with $100,000 capital to manufacture stokers, burners, boilers, etc., by Samuel Houston, 805 Main street, Worcester, Mass.

BOSTON—Ace Spark Plug Co. has been incorporated with $50,000 capital to manufacture spark plugs, airplane accessories, etc., by Carman G. Paul, 14 Green street, Brookline, Mass.

BOSTON—Royal Metal Clad Door Co. Inc., 2178 Washington street, has been incorporated with $25,000 capital to manufacture architectural and ornamental sheet metal fronts, ceilings, etc., by Henry B. Allen.

BOSTON—Charles J. McCarty Co. Inc. has been incorporated with $100,000 capital to manufacture and deal in hardware, machinery, tools, etc., by Charles J. McCarty, 85 Orchard street, Jamaica Plain, Mass.

CAMBRIDGE, MASS.—University Floor Machine Co. has been incorporated with $5000 capital to manufacture and deal in floor and woodwork cleaning machinery by E. G. Burns, 156 Norfolk street.

MALDEN, MASS.—Lumsden Bros. Co., 323 Commercial street, has been incorporated with 500 shares no par value stock to manufacture, fabricate and weld piping, etc., by Robert B. Lumsden.

WARE, MASS.—Red Wing Flying Service Inc. has been incorporated with $30,000 capital to manufacture aircraft and aircraft equipment by A. Turner Wells, Southbridge, Mass.

WORCESTER, MASS.—Bancroft Pressed Metal Co. has been incorporated with $50,000 capital to engage in the toolmaking business, steel, brass and aluminum stamping, etc., by Arvid S. Hallgren, 31 Stanton street.

NEWARK, N. J.—Crown Mfg. Co. has been incorporated with $100,000 capital to manufacture watches, cases, etc., by Elwood S. Leary, Newark, attorney.

NEWARK, N. J.—Majestic Cabinet Co. Inc. has been incorporated with 500 shares no par value stock to manufacture metal radiator covers, by Abraham Hochberg, Newark, attorney.

NORTH BERGEN, N. J.—Unique Metal Novelty Mfg. Co. Inc. has been incorporated to manufacture metal goods, by William A. Kaufman, Newark, attorney.

TRENTON, N. J.—Lincoln Chinalite Co. Inc. has been incorporated with $125,000 capital to manufacture lighting devices, etc., by Alexander Budson, Trenton, attorney.

NEW YORK—Leardon Boiler Works has been incorporated with $10,000 capital by E. J. Fandrey, 307 Washington street, Brooklyn, N. Y., attorney.

NEW YORK—Smith Steel Rule has been incorporated with $20,000 capital to manufacture and deal in dies, tools, etc., by Feinstein & Rosenberg, 1540 Broadway, attorneys.

ROCHESTER, N. Y.—Genesee Tool & Die Corp. has been incorporated with $25,000 capital by J. E. Auff, Rochester, attorney.

OKLAHOMA CITY, OKLA.—Oklahoma Wire & Iron Works has been incorporated with $10,000 capital by L. A. Ralph, R. Bachle and C. G. Bachle.

OKLAHOMA CITY, OKLA.—Star Mfg. Co. has been incorporated with $15,000 capital by D. H. Rowland, manager, N. F. Rowland and P. A. Guiles to manufacture steel tool boxes and accessories for oil field trade, etc.

TULSA, OKLA.—Oklahoma Metals Corp., Daniel building, has been incorporated with $10,000 capital by William Ungerman, B. Watt and M. G. Cohen.

DUNDAS, ONT.—Neu-Flame Canada Ltd. has been incorporated to manufacture and deal in electric stoves, heating and lighting apparatus and devices with $1,000,000 capital and 40,000 shares no par value stock by Norman E. Strickland, Harold C. F. Mockridge, Robert G. Ferguson and others, all of Toronto.

TORONTO, ONT.—De Havilland Aircraft of Canada Ltd. has been incorporated to manufacture and deal in airplanes, flying machines, airships, etc., with $500,000 capital and 30,000 shares no par value stock by William Zimmerman, Leslie E. Blackwell and Kenneth D. Haywood, all of Toronto.

WINDSOR, ONT.—Canadian Gas & Equipment Ltd. has been incorporated to manufacture and deal in oxygen and acetylene gas and welding equipment and supplies by William C. and Albert F. Wall, both of Detroit, and John L. Schade, of Windsor.

WINDSOR, ONT.—Dominion Electric Porcelain Ltd. has been incorporated to manufacture and deal in porcelain for electrical, mechanical and other purposes with $475,000 capital and 25,000 shares no par value stock by Godfrey E. McNab and Howard R. Ferguson, both of Walkerville.

CHOISY, QUE.—Bits Universal Ltd. has been incorporated to manufacture and deal in machinery and metals, with 100,000 shares no par value stock by William Bayliss, Archibald S. Wilson and Harley Wilson, all of Montreal.

MONTREAL, QUE.—Stewart Dupuis Ltd. has been incorporated to manufacture and deal in plant and machinery for the manufacture of aerated waters and chemicals, with $20,000 capital by Andrew T. Stewart, Francois A. Dupuis and Joseph M. Deduc, all of Montreal.

New Trade Publications

RECORDING THERMOMETERS—Foxboro Co., Foxboro, Mass., has issued a bulletin on its indicating, recording and controlling thermometers for industrial use. It is illustrated.

PATTERN EQUIPMENT—Electro-Chemical Pattern & Mfg. Co., 3975 Beaufait avenue, Detroit, is circulating a folder describing the advantages of its copper patterns.

STEEL PIPE—National Tube Co., Pittsburgh, in a current bulletin discusses the use of copper-bearing steel pipe. Illustrations show the comparative results of exposure of copper-bearing steel and steel without copper.

INDUSTRIAL SITES—Chamber of commerce, Jeannette, Pa., is distributing a circular on the advantages of that city as an industrial location. Fast freight service to leading consuming centers is diagrammed.

SAND AERATOR—William Sellers & Co., 1600 Hamilton street, Philadelphia, has circulated a folder describing and illustrating its sand aerator. The folder gives the advantages of the machine, its uses and prices.

PRODUCTION TOOLS—Consolidated Machine Tool Corp. of America, Rochester, N. Y., has issued a catalog of production tools specially designed for use in automotive plants and others engaged in mass production. It is fully illustrated.

ALUMINUM PISTONS—Aluminum Industries Inc., Cincinnati, describes in a current bulletin its permite unitype pistons for automotive use. Its features are illustrated by drawings. Proper design to obtain most efficient operation is discussed.

FOUNDRY EQUIPMENT—American Foundry Equipment Co., Mishawaka, Ind., has published a bulletin on its foundry equipment. The booklet contains many views of installations, phantom views of several products and gives the advantages of each.

WATER SOFTENER—Graver Corp., East Chicago, Ind., has issued a catalog of its water softening equipment, using the hot process. It is illustrated by diagrams and halftones to show various steps. Discussion of the process and figures of savings over former methods make up the text.

PULVERIZED COAL—Application of pulverized coal to metallurgical work is discussed in a reprint of a paper being distributed by the Combustion Engineering Corp., New York. The article discusses present practice in the iron and steel industry and presents definite figures on economies obtained in typical instances.

LUBRICATION—Texas Co., New York, has added another to its series of bulletins on lubrication of various industrial machines. The current bulletin is devoted to automatic coal-firing equipment, coal pulverizers and automatic stokers. Discussion of the problems and their solution is illustrated by halftones and diagrams to show proper application of the lubricants.

SAND HANDLING EQUIPMENT—Chain Belt Co., Milwaukee, has issued a bulletin on its sand handling, conditioning and mold conveying systems for the foundry. The bulletin lists the advantages of the sand systems, their adaptability, and reductions in cost that justify the equipment. The various parts of complete sand handling and conditioning systems are discussed for various types of foundries. The bulletin is illustrated with reproductions from photographs of many units. The bulletin is featured by layout sketches of several installations.

Pipe and Tube Prices—Plate Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

To large jobbers these discounts are increased on black by 1 point and a supplementary discount of 5 per cent; on galvanized by 1½ points with a supplementary 5 per cent. Extra 5 per cent granted in the 4th quarter 1927 and 1st quarter 1928 discontinued April 2, 1928.

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLING

Butt Weld

	Black	Galv.
¼ and ⅜-inch	+11	+36
½-inch	23	5
¾-inch	28	11
1 and 1¼-inch	31	15
1½ and 2-inch	35	18

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	9
2½ to 3½-inch	28	12
4 to 6-inch	30	17
7 and 8-inch	29	16
9 to 12-inch	26	11

REAMED AND DRIFTED

2-inch to 6-inch—Two points less than above

EXTRA STRONG, PLAIN ENDS

¼ and ⅜-inch	+13	+48
½-inch	23	7
¾-inch	28	12
1 to 2-inch	34	18

Lap Weld

2-inch	29	13
2½ to 4-inch	34	20
4½ to 6-inch	33	19
7 and 8-inch	31	17
9 to 12-inch	21	8

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

Large jobbers obtain additional discount of 1 point with supplementary discounts of 6 and 2½ per cent on black and galvanized.

On extra or double extra strong pipe fitted with threads and couplings basing discount lowered 5 points from plain end price. Fitted with threads only, basing discount lowered 3 points for random lengths.

Boiler Tubes

Pittsburgh carload discounts

STEEL (Lap Weld)

2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ to 3¾-inch	56 off
4-inch	59 off
4½ to 6-inch	48 off

Subject to two 5 per cent discounts on full carload shipments. On less than 10,000 pounds, base discount reduced 6 points and one 5 per cent allowed. On 10,000 pounds to carload, base discount reduced 4 points and two 5 per cents allowed.

CHARCOAL IRON

1½-inch	1 off
1¾-inch	8 off
2 and 2¼-inch	13 off
2½ and 2¾-inch	16 off
3-inch	17 off
3¾ to 3½-inch	18 off
4-inch	20 off
4½-inch	21 off

Subject to 10 per cent discount on full carload lots. On less than 10,000 pounds, base discount reduced 2 points and no preferential allowed. On 10,000 pounds to carload, 5 per cent preferential allowed.

SEAMLESS COLD DRAWN

1-inch	63 off
1¼ and 1½-inch	55 off
1¾-inch	39 off
2 and 2¼-inch	34 off
2½ and 2¾-inch	42 off
3-inch	48 off
3¼ and 3½-inch	50 off
4-inch	53 off
4½, 5 and 6-inch	42 off

SEAMLESS HOT ROLLED

1¾-inch	39 off
2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ and 3½-inch	56 off
4-inch	59 off
4½, 5 and 6-inch	48 off

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed.

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	**12-gage**	**16c**
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅜-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for lengths over 24 feet.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, date Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weight.

Over 100 to and including 110 inches	.05c
Over 110 to and including 115 inches	.10c
Over 115 to and including 120 inches	.15c
Over 120 to and including 125 inches	.25c
Over 125 to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 to and including 84 inches	.10c
Over 84 to and including 96 inches	.20c
Over 96 to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds square foot..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds square foot.... .20c

Plates ordered 7.65 pounds square foot .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A-B	1.50c

Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet.....No extra

Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

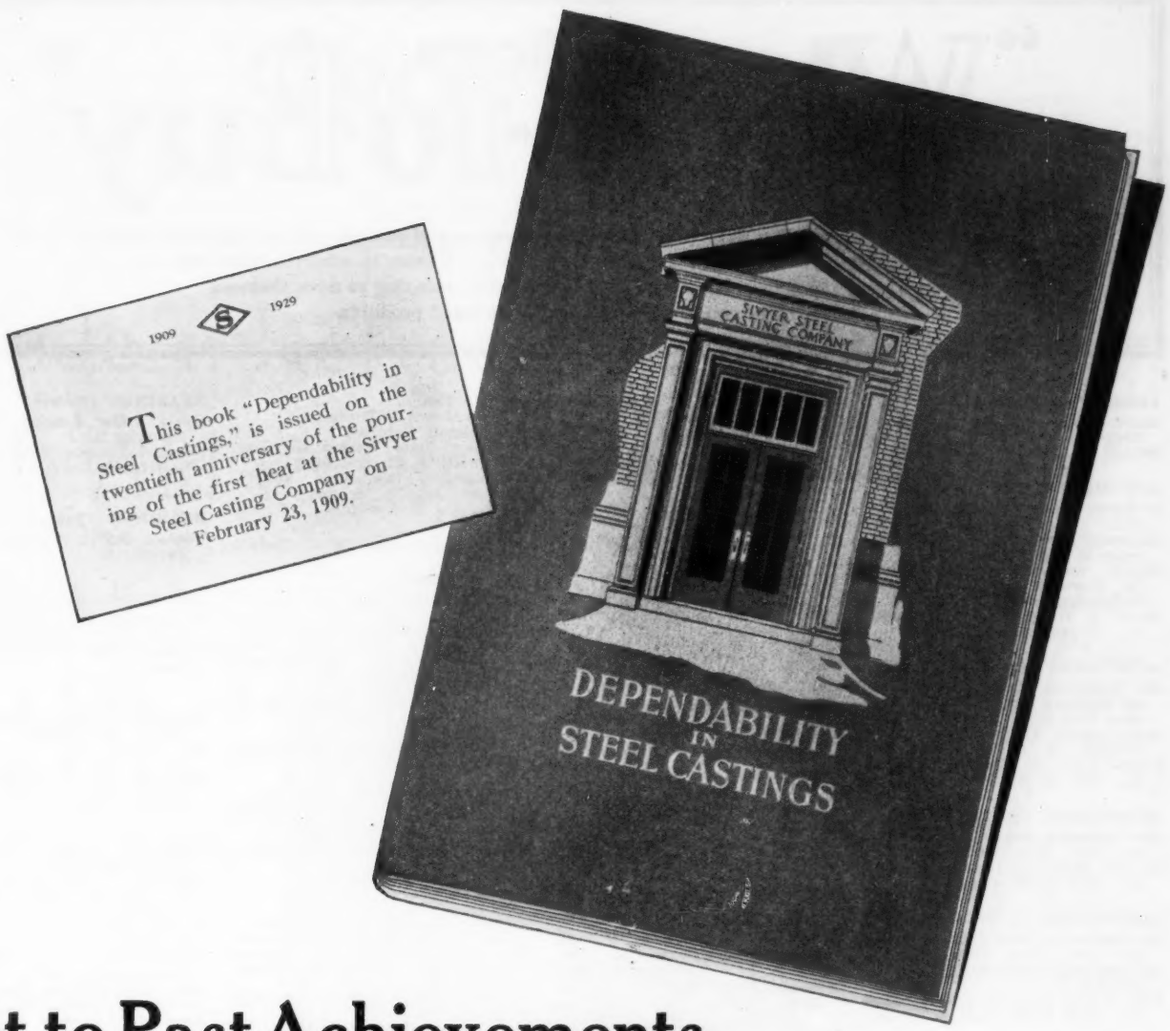
With not more than four straight cuts. (Including straight taper plates)

Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)

Additional extra ..... .20c


1909 1929
This book "Dependability in Steel Castings," is issued on the twentieth anniversary of the pouring of the first heat at the Sivyer Steel Casting Company on February 23, 1909.
SIVYER STEEL CASTING COMPANY
DEPENDABILITY IN STEEL CASTINGS

Not to Past Achievements

• • • • But to Future Progress

When we look over the extensive line of cast steel alloys that our laboratory has developed—

When we examine the routine checks that our production control men have instituted to assure uniform quality—

When we see the elaborate equipment for testing fatigue, wear, and similar field worries that our research men have developed to gauge experiments—

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For such a story involves not only the remarkable rise of steel castings to their present high place—but the opportunities which they present to industry's design, manufacture, and sale of today and tomorrow.

To this end the book pictured has been prepared. A copy will be sent gladly upon request.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

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